

Addendum

Phase II and Phase III Bond Release Application

PaciCorp

File in:

Confidential

Shelf

Expandable

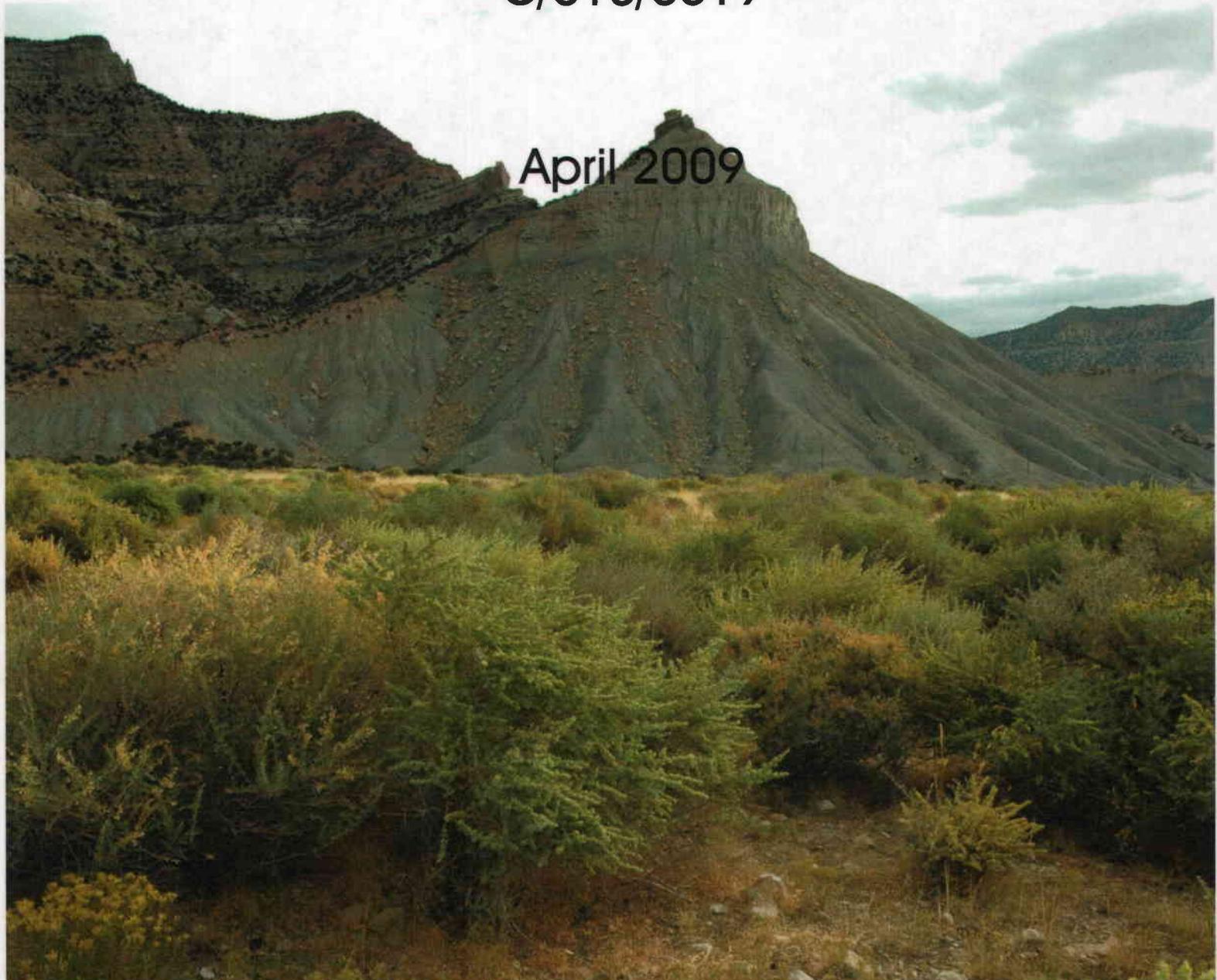
Refer to Record No 0009 Date 04/27/2009
In C015/0019, 0009, Sharing
For additional information

Energy West Mining Company

Cottonwood/Wilberg "Old" Waste Rock Site

C/015/0019

April 2009



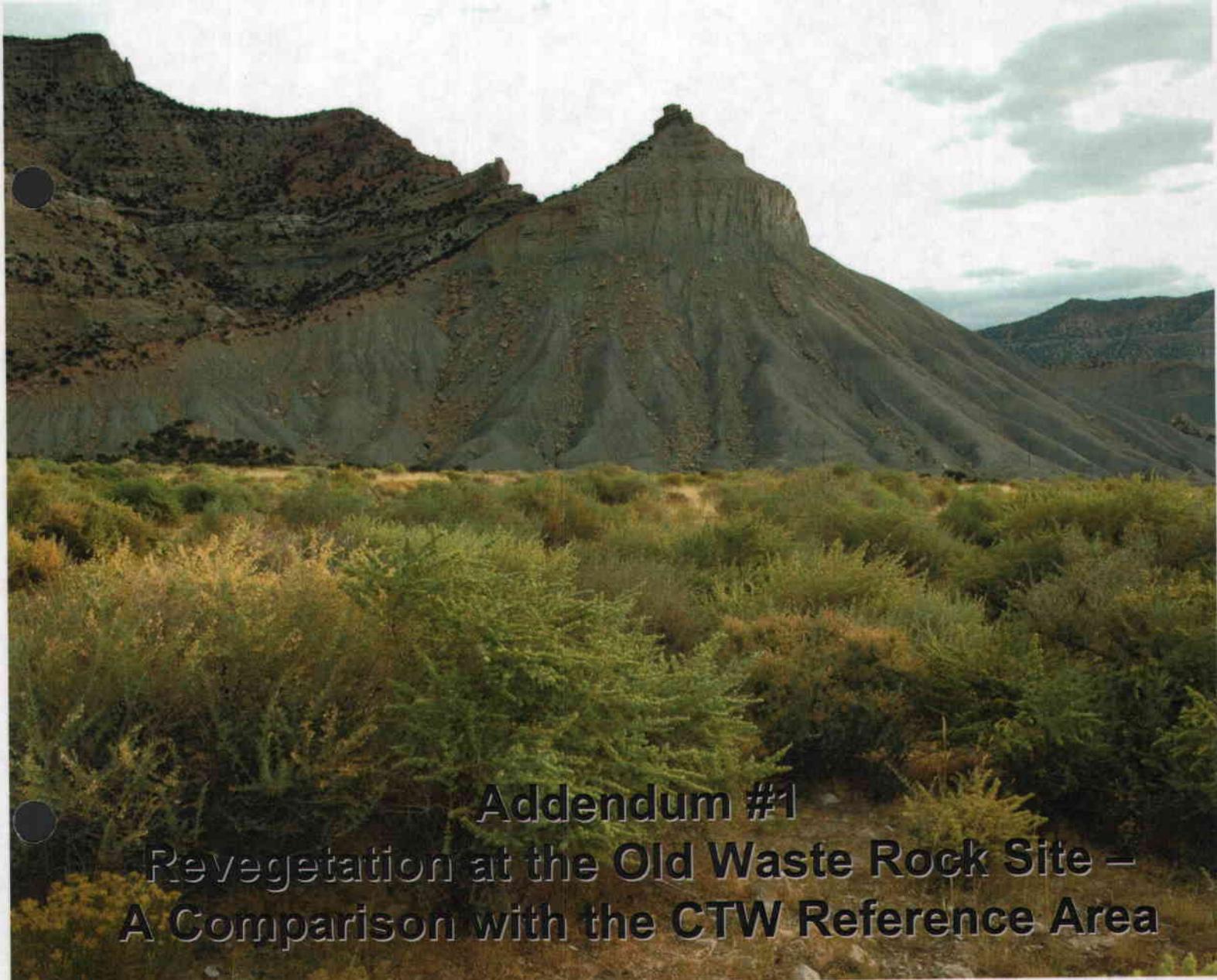
Application for Phase II and III Bond Release Cottonwood/Wilberg "Old" Waste Rock Site

2001 Sampling and Report

Cells 1 – 4: Quantitative Sampling

Berms 1 – 4: Quantitative Sampling

Reference Area: Quantitative Sampling



Addendum #1

**Revegetation at the Old Waste Rock Site –
A Comparison with the CTW Reference Area**

0009



COPY

C/015/0019 Incoming
OK #3213

Energy West Mining Company
P. O. Box 310
15 No Main Street
Huntington, Utah 84528

April 27, 2009

Utah Division of Oil Gas and Mining
Coal Program
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Subject: Deficiency Response to the Phase II and III Bond Release of the "Old" Waste Rock Site], PacifiCorp, Cottonwood/Wilberg Mine, C/015/0019, Task ID #2964

PacifiCorp, by and through its wholly-owned subsidiary, Energy West Mining Company ("Energy West") as mine operator, hereby responds to the above stated deficiency document dated January 27, 2009. The following deficiencies require additional information regarding achievement of success standards and the protocol followed. Reclamation of the 13.81 acre old waste rock site cells and berms were completed in 1994. Phase I Bond Release was approved on July 22, 1999. The Phase II and III Bond Release application was submitted on April 16, 2008.

The responses to the deficiencies are attached. If there are any questions or concerns contact Dennis Oakley at (435) 687-4825.

Sincerely,

A handwritten signature in black ink that reads "Kenneth S. Fleck".

Ken Fleck
Manager of Geology and Environmental Affairs

Cc File

RECEIVED

APR 30 2009

DIV. OF OIL, GAS & MINING

File in:
C/015/0019/2009 Incoming
Refer to:
 Confidential
 Shelf
 Expandable
Date 04/29/09
For additional information

APPLICATION FOR COAL PERMIT PROCESSING

COPYPermit Change New Permit Renewal Exploration Bond Release Transfer **Permittee:** PacifiCorp**Mine:** Cottonwood/Wilberg Mine**Permit Number:** C/015/0019**Title:** Application for Phase II and Phase III Bond Release of the Cottonwood/Wilberg "Old" Waste Rock Site, PacifiCorp, Cottonwood/Wilberg Mine, C/015/0019, Emery County, Utah**Description,** Include reason for application and timing required to implement:**Instructions:** If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- Yes No 1. Change in the size of the Permit Area? Acres: _____ increase decrease.
 Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
 Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
 Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
 Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
 Yes No 6. Does the application require or include public notice publication?
 Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
 Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
 Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
 Yes No 10. Is the application submitted as a result of other laws or regulations or policies?

Explain:

- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
 Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
 Yes No 13. Does the application require or include collection and reporting of any baseline information?
 Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
 Yes No 15. Does the application require or include soil removal, storage or placement?
 Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
 Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
 Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
 Yes No 19. Does the application require or include certified designs, maps or calculation?
 Yes No 20. Does the application require or include subsidence control or monitoring?
 Yes No 21. Have reclamation costs for bonding been provided?
 Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
 Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Kenneth Fleck
Print NameKenneth S. Fleck

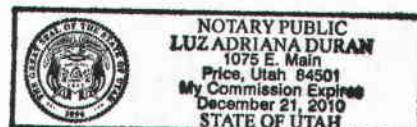
Manager of Environmental Affairs

4/27/09

Sign Name, Position, Date

Subscribed and sworn to before me this 27th day of April, 20 09Luz Adriana Duran
Notary Public

My commission Expires:

Attest: State of Utah } ss:
County of Emery

For Office Use Only:

Assigned Tracking
Number:

Received by Oil, Gas & Mining

RECEIVED**APR 30 2009**

DIV. OF OIL, GAS & MINING

Deficiency Response Document

The following responses to deficiencies are formatted as found in the technical analysis document. They are broken down into logical section headings similar to the R645 regulations. In each section, the regulation number along with the associated deficiency is follow by the Permittee's italicized response.

R645-301-356.200 - Minimum woody species stocking densities needs to be specified on the basis of local and regional conditions in consultation with the DOGM and the Division of Wildlife Resources or other regulatory agency. The Permittee needs to demonstrate that minimum stocking densities have been achieved on the reclaimed area, and that no trees or shrubs that have been in place for less than two growing seasons are counted toward stocking adequacy as per R645-301-356.232.

The Permittee must demonstrate that 80% of the woody species used to demonstrate stocking density have been in place for at least 60% of the responsibility period (or six years). In this demonstration, the Permittee must provide in the bond release application all data and analysis reports from the monitoring years.

PacifiCorp complete a sampling program in 2001 that compared the reclaimed cells and berms at the waste rock site to the reference area north of the site. This program found that woody species density of the reclaimed cells and berm (2,219.5 plants per acre) was far greater than the woody species density of the reference area (917.2 plants per acre). Refer to Addendum #1 in attached Addendum Volume.

At the time of initial disturbance, 1982, woody species density at the reference area was recorded at 1,495 plants per acre (refer to Volume 2, Page 2-125, Table 4). Current woody species density (as reported in the bond release application for Year Two: 2006 sampling) found that the combined cells and berm were quite high (5,345.3 plants) as compared to the reference area (1,359.7 plants per acre).

R645-301-356.110 – A signed statement by a regulatory authority needs to be included in the application describing the current range condition of the reference area and surrounding vegetation.

PacifiCorp contacted the Natural Resource Conservation Service (NRCS) to comply with the Division's request. The range condition survey was conducted on April 21, 2009 by Dean Stacy, Rangeland Management Specialist. Mr. Stacy's report is found in Addendum #2 in the attached Addendum Volume.

The Permittee included the non-native invasive plant *Bromus tectorum*, (Cheatgrass), in all parameters of vegetation monitoring. The presence of *Bromus tectorum* does not affect bond release, but it should not be included in demonstration of achievement of success standards.

Bromus tectorum is a well established invasive species throughout southeastern Utah. It is found throughout the range surrounding the waste rock site. Open range areas, similar to the waste rock site, are ideal habitats for *Bromus tectorum* to take hold. Most likely the source seed was imported by wildlife or wind.

Energy West talked with Patrick Collins (Mt. Nebo Scientific) who has historically monitored the site as well as gathered the data for the Phase II and III bond release application. As indicated in the Year 1 report, the total living cover for the reclaimed cells and berms was 51.89%. *Bromus tectorum* makes up 6.88% of this cover. In Year 2, the total living cover was 53.30%, with *Bromus tectorum* making up only 2.71% of the total living cover. Comparing the two years could indicate either the *Bromus tectorum* is declining or the sampling took place in a different proximity within the site. However, what the report correctly points out is that *Bromus tectorum* is a statistically insignificant cover source. If the species is excluded from monitoring (using the Year 1 data), it shows a mean cover of 45.01% compared to 30.16% reference area. Without having this information included in the data, this status of *Bromus tectorum* would have never been known.

The Division did not require a weed control program to eradicate all weeds within the site to achieve the standards of success for bond release. The presence or absence of this plant does not affect significantly or sway the outcome of the total living cover results. *Bromus tectorum* is a statistically insignificant plant that has been imported into the waste rock site area.

Addendum #1

Demonstration that 80 percent of the woody species have been in place for 60 percent of the responsibility period (6 years)

Background and Discussion

PacifiCorp originally submitted an application for Phase II and Phase III bond release for the "Old" waste rock site for the Cottonwood, Wilberg, and Des Bee Dove mines in April of 2008. Since that time, the Division has performed a completeness review, on-site inspection, and most recently, determined that there are deficiencies that must be addressed prior to approving the Phase III bond release for the site. This addendum to the original application demonstrates (as required by R645-301-356.232) that at the time of bond release, trees and shrubs will be healthy, and at least 80 percent will have been in place for at least 60 percent of the applicable minimum period of responsibility.

The "Old" waste rock site was designed as a waste rock disposal site composing of seven separate cells. In other words, as one cell was filled to its capacity, the cell would be reclaimed and waste material would be disposed of into another cell. This process continued until the seventh and last cell was filled to its capacity and reclaimed in 1993. Because the cells were reclaimed at different times, conclusion of the responsibility period occurred at different times. For example, Cell #1 was reclaimed in 1984, and therefore, the 10 year responsibility period concluded in 1994. Cell #7 was reclaimed in 1993, and therefore, the responsibility period concluded in 2003 as long as the vegetation standards were met.

Historically, vegetation at the "Old" waste rock site tended to have a difficult time becoming established. This was due to poor soil conditions, drought, and other environmental conditions. However, over time the vegetation took hold and flourished. Therefore, PacifiCorp decided that it would be most prudent to attempt bond release for all cells and berms simultaneously following the scrutiny of two conditions. Condition one required established vegetation over the entire site. Condition two required that all cells have at least 10 years growth.

In 2005, PacifiCorp began the first of two consecutive years of quantitative vegetation monitoring to determine if all vegetation parameters identified in the Utah Coal Regulations equaled or exceeded the approved success standards for post mining land use. The post mining land use for this site is designated as grazing and wildlife habitat. This means that success of vegetation will be determined on the basis of tree and shrub stocking and vegetative ground cover. At the time of bond release, 80 percent of the trees and shrubs used in determining this success shall have been in place for 60 percent of the applicable responsibility period.

Demonstration

Two ways can be used to demonstrate compliance to R645-301-356.200; 1) review the monitoring data in year 4 following final seeding in 1993, or 2) review the monitoring data at least six years prior to the Phase III bond release application. The latter was chosen because of the availability of sufficient and applicable data.

In 2001, PacifiCorp retained the services of Mt. Nebo Scientific to perform a complete quantitative vegetative study of the waste rock site as a precursor to the Phase III bond release

application. Cells 1-7, Berms 1-4, and the Reference Area were all sampled and statistically analyzed at this time. This resulting report is included at the end of this document.

Data from each cells, berms, and reference area were first summed separately to identify site differences or potential problem areas. Data collected from the cells and berms were then combined and compared to the data collected for the reference area. Parameters compared included cover (total living), frequency, composition, woody species density, productivity, and diversity. The results show that all parameters observed in the cells and berms exceeded those same parameters observed in the reference area. The table below summarizes Table 5 found on page 13 of the attached monitoring report.

Statistical Summary for Reclaimed vs. Reference Areas Sampled in 2001.

Reclaimed Areas			
Total Living Cover	x=45.44	s=16.33	n=240
Density	x=2219.51	s=2614.02	n=240
Productivity	x=1083.59	s=954.52	n=240
Reference Area			
Total Living Cover	x=30.46	s=20.58	n=50
Density	x=917.22	s=510.58	n=50
Productivity	x=544.33	s=456.39	n=50
Reference Area (1982)			
Density	x=1,495	-	-

x = sample mean, s = sample standard deviation, n = sample size

For the purposes of this addendum, woody species density in the reclaimed area is 2,219.51 plants per acre as compared to 917.22 plants per acre in the reference area. Statistically speaking, in 2001, 242 percent of the woody species in the reclaimed area were in place seven years prior to the bond release application in 2008; and thus demonstrates conformity to R645-301-356.200.

The standard that was set in 1982 to equal or exceed at the time of bond release was 1,495 plant per acre as found by the consultant Jerry Barker from Bio-Resources Inc. This standard was far exceeded as shown in the year two sampling (see Phase III bond release application), which reported a wood species density of 5,345.3 plants per acre; and therefore, again demonstrates conformity to R645-301-356.

**REVEGETATION AT THE
OLD WASTE ROCK SITE:
A COMPARISON WITH THE
CTW REFERENCE AREA
2001**

COTTONWOOD MINE , UTAH



Prepared by

MT. NEBO SCIENTIFIC, INC.
330 East 400 South, Suite 6
P.O. Box 337
Springville, Utah 84663
(801) 489-6937

Patrick D. Collins, Ph.D.

for

ENERGY WEST MINING COMPANY
P.O. Box 310
Huntington, Utah 84528



March 2002

TABLE OF CONTENTS

INTRODUCTION	1
METHODS	2
Sample Areas	2
Cover, Frequency and Composition	3
Woody Species Density	3
Production	4
Diversity	4
Sample Adequacy & Statistical Comparisons	5
Photographs	5
Raw Data	6
RESULTS	6
Reclaimed Areas	6
Reference Area	7
Comparisons Between Areas	7
CONCLUSIONS	7
SUMMARIES TABLES	9-13
FIGURES	14-15
COLOR PHOTOGRAPHS	15-17
SUMMARIZED RAW DATA	Appendix

REVEGETATION AT THE OLD WASTE ROCK SITE:

A COMPARISON WITH THE CTW REFERENCE AREA

2001

INTRODUCTION

In the past, several waste rock "cells" bounded by "berms" were constructed as disposal areas for waste rock products from the Cottonwood Mine. The total site is less than 15 acres in size.

Since the time the cells were constructed they have been filled to the engineered capacity with the waste rock material created by coal mining operations. The waste material was then covered with topsoil or substitute topsoil and revegetated to a condition that should ultimately support the post-mining land use. In order to support the wildlife that exist on this rangeland, specific vegetation standards have been placed by designating a "Reference Area", or an area previously chosen to be protected from unnatural disturbances, that can represent vegetation standards for final revegetation success. The area designated as a Reference Area lies adjacent to the Old Waste Rock Site. The plant community supported on the Reference Area is Pinyon-Juniper, the same community that was disturbed to create the waste rock site for the mine. Because the Reference Area is located in such close proximity, other environmental variables were also similar to the reclaimed waste rock site (e.g. soils, elevation, exposure, precipitation, etc.).

Because the cells were filled to capacity at different times, they were sometimes also reclaimed at

different times. Or, because all cells and berms were *not* reseeded at the same time, conclusion of the operator's *responsibility period* for some cells and berms are different than others. This means that for some cells and berms Phase III Bond Release applications could have been submitted before others based on the time of reclamation. However, previous vegetation studies of the site suggest that it would be most prudent to attempt bond release for all cells and berms at the same time. Phase III Bond Release applications for all sites can therefore be initiated beginning with vegetation data recorded in 2002.

The data recorded in 2001 for this report was intended as a precursor or prototype to the final Phase III Bond Release application. It provides valuable data and information that will be used to design the final bond release studies such as sample sizes for adequacy, sampling design methods, and results of all parameters that will be necessary for approval of future Phase III Bond Release.

METHODS

Sample Areas

The following sites were sampled on the Cottonwood Mine Old Waste Rock Site:

Cell 1	Berm 1
Cell 2	Berm 2
Cell 3	Berm 3
Cell 4	Berm 4
Cell 5	CTW Reference Area
Cell 6	
Cell 7	

Data from each of the above areas were first summed separately to identify differences between sites or potential areas where revegetation may not have been successful. The number of samples taken was a function of the size of each area. In other words, in larger areas more samples were taken than the smaller areas. The aforementioned previous vegetation studies at the Old Waste Rock site suggested that all reclaimed cells and berms should be 'lumped' together to determine the results of the reclaimed area as a whole as opposed to individual areas.

Cover, Frequency and Composition

Cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on the raw data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows "A Utah Flora" (Welsh et al. 1993).

Woody Species Density

Density of woody plant species of the reclaimed and reference areas were recorded using a distance method called the point-quarter. In this method, random points were placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average point-to-individual distance was equal to the square root of the mean area per individual.

Production

Total annual biomass production was estimated by clipping, drying and weighing current annual growth in each sample quadrat. "Double sampling" using four quadrats were estimated around the clipped quadrat. Herbaceous and woody species were summarized separately.

Diversity

There are several good methods to assess diversity in plant communities. Three diversity indices have been reported in this document for the reclaimed areas and the Reference Area. One basic measurement of species diversity recorded was the average number of species encountered at each quadrat. Next, MacArthur's Diversity Index was calculated. It also is an effective diversity measurement and is computed using the equation $1/\sum pi^2$ (MacArthur and Wilson 1976, *The Theory of Island Biogeography*, Princeton: Princeton University Press). In this equation pi is the proportion of sum frequency contributed by the i th species in the sample area of concern. The proportional contribution of each species is then squared and the values for all species in the sample areas are summed. This index integrates the number of species and the degree to which frequency of occurrence was equitably distributed among those species. In other words, this index provides greater weight to those species that are present more often (with greater frequency) than those that are merely "present" in one or two quadrats. Finally, the total number of species present in the sample quadrats, or "Richness", was calculated for the sample areas.

Sample Adequacy & Statistical Comparisons

As recommended by the State of Utah, Department of Natural Resources, Division of Oil, Gas & Mining (DOGM) guidelines, sampling adequacy was calculated. The goal for the parameters of this study was 80% confidence level with a 10% change in mean (one-tailed t-value was used).

The sample adequacy formula used is given below.

$$nMIN = \frac{t^2 s^2}{(dx)^2}$$

where,

$nMIN$	= minimum adequate sample
t	= appropriate confidence t-value
s	= standard deviation
x	= sample mean
d	= desired change from mean

Student's t-tests were employed to compare the reclaimed areas with the Reference Area for living cover, density and productivity. All sample means, standard deviations, and sample sizes were included in this report to enable the reviewers to check or apply further statistical tests if desired. Summarized raw data have also been included in the Appendix of this report for the total cover, composition, and frequency of each sample area.

Photographs

Color photographs of each cell, berm and the Reference Area were taken during the sample

period and have been included with this report.

Raw Data

The raw cover data have been summarized on spreadsheets and have been included in the Appendix.

RESULTS

Reclaimed Areas

The total living cover for the cells and berms combined was estimated at 45.44% [Table 1 (A)]. Of the living cover, 66.16% of it was composed of grass species, 27.24% shrubs and 2.22% forbs [Table 1 (B)]. The species present in the quadrats are shown on Table 1 (C). The cover values for all species can be found in the raw data summaries included in the Appendix of this report.

The total woody species density of the cells and berms was 2,200 individuals per acre [Table 2 (A)]. The total annual biomass production was measured to be 1,084 pounds per acre [Table 2 (B)].

Reference Area

The total living cover (overstory plus understory) for the CTW Reference Area near the Old Waste Rock site was estimated at 30.46% [Table 3 (A)]. The understory cover was estimated at 14.52% [Table 3-(A)]. The total living understory cover consisted of 85.80% shrubs species and 14.20% forbs [Table 3 (B)]. The species present in the quadrats are shown on Table 3 (C).

The total woody species density for the Reference Area was estimated at 917 individuals per acre [Table 4 (A)]. The total annual biomass production was 544.33 pounds per acre [Table 4 (B)].

Comparisons Between Areas

Table 5 shows statistical comparisons between the reclaimed cells and berms and the Reference Area. When total living cover, woody species density, and productivity of the reclaimed areas were compared with the Reference Area, the reclaimed areas were significantly greater for all parameters. The above parameters plus composition and diversity comparisons are shown graphically in Figure 1 through Figure 6.

CONCLUSIONS

As a prototype study to Phase III Bond Release efforts that could begin in 2002, quantitative vegetation data were recorded in 2001 within the Cottonwood Mine's reclaimed Old Waste Rock

site and the CTW Reference Area. The Reference Area had been chosen previously to act as a standard for the revegetation success of the reclaimed site. Although the reclaimed cells and berms of the Old Waste Rock Site were recorded separately, the data were 'lumped' together in the analyses of this report to represent the site as a whole.

When total living cover, woody species density and annual biomass production were compared, all were significantly higher in the reclaimed areas. Composition of the reclaimed areas favored grasses. Three different diversity indices were also compared. In each of these cases, diversity of the reclaimed areas was greater when compared to the Reference Area.

This study suggests that, in the future when the reclaimed Old Waste Rock site is sampled and compared for final Phase III Bond Release, it should be attainable. This study was done with the goal to achieve sample adequacy at the 80% level. Results from the study also suggest more samples will be necessary to achieve sample adequacy at the 90% level ($\pm .10\%$ deviation) for some of the parameters (i.e. woody species density and biomass productivity).

TABLE 1: Total cover (A), composition (B), and species present (C), summary for the reclaimed cells and berms at Cottonwood Mine's waste rock site (2001).

A.	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
TOTAL COVER			
Living Cover	45.44	16.33	240
Litter	9.37	5.95	240
Bareground	15.98	11.71	240
Rock	24.82	13.09	240

B.	PERCENT COMPOSITION	STANDARD DEVIATION	SAMPLE SIZE
Shrubs	27.24	28.64	240
Forts	2.22	11.09	240
Grasses	66.16	32.26	240

C.

SPECIES PRESENT

<i>Agropyron cristatum</i>	<i>Gutierrezia sarothrae</i>
<i>Artemisia tridentata</i>	<i>Halogeton glomeratus</i>
<i>Atriplex canescens</i>	<i>Hilaria jamesii</i>
<i>Atriplex confertifolia</i>	<i>Hordeum jubatum</i>
<i>Bromus tectorum</i>	<i>Kochia scoparia</i>
<i>Cercocarpus montanus</i>	<i>Machaeranthera grindeliaoides</i>
<i>Chrysothamnus nauseosus</i>	<i>Malcomia africana</i>
<i>Elymus cinereus</i>	<i>Penstemon sp.</i>
<i>Elymus hispidus</i>	<i>Poa secunda</i>
<i>Elymus lanceolatus</i>	<i>Sphaeralcea coccinea</i>
<i>Elymus smithii</i>	<i>Stipa comata</i>
<i>Ephedra viridis</i>	<i>Stipa hymenoides</i>

TABLE 2 : Woody species densities (A) and productivity (B) for the reclaimed cells and berms at Cottonwood Mine's waste rock site (2001).

A.

WOODY SPECIES DENSITY	NUMBER/ACRE
TOTAL	<u>2219.51</u>
Standard Deviation	2614.02

B.

	NUMBER/ACRE	SAMPLE SIZE
Herbaceous	530.05	240
Woody	<u>553.55</u>	<u>240</u>
TOTAL	<u>1083.59</u>	240
Standard Deviation	954.52	

TABLE 3: Total cover (A), composition (B), and species present (C), summary for the CTW Reference Area at Cottonwood Mine's waste rock site (2001).

A.	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
TOTAL COVER			
Overstory Cover	15.96	20.58	50
Understory Cover	14.52	11.63	50
Total Living Cover	30.46	20.55	50
Litter	35.34	26.57	50
Bareground	26.88	21.20	50
Rock	23.26	21.42	50

B.	PERCENT COMPOSITION	STANDARD DEVIATION	SAMPLE SIZE
Shrubs	85.80	30.25	50
Forts	14.20	30.25	50
Grasses	0.00	0.00	50

C.	SPECIES PRESENT
<i>Cercocarpus montanus</i>	
<i>Cryptantha</i> sp.	
<i>Elymus salinus</i>	
<i>Ephedra viridis</i>	
<i>Eriogonum bicolor</i>	
<i>Euphorbia fendleri</i>	
<i>Juniperus osteosperma</i>	
<i>Opuntia polyacantha</i>	
<i>Penstemon</i> sp.	
<i>Pinus edulis</i>	
<i>Rhus aromatica</i>	
<i>Yucca harrimaniae</i>	

TABLE 4: Woody species densities (A) and productivity (B) for the CTW Reference Area at Cottonwood Mine's waste rock site (2001).

A.

WOODY SPECIES DENSITY	NUMBER/ACRE
TOTAL	<u>917.22</u>
Standard Deviation	510.58

B.

	NUMBER/ACRE	SAMPLE SIZE
Herbaceous	10.20	50
Woody	<u>534.13</u>	<u>50</u>
TOTAL	<u>544.33</u>	<u>50</u>
Standard Deviation	456.39	

TABLE 5: Statistical summary sheet for the reclaimed cells and berms and the CTW Reference Area at Cottonwood Mine's waste rock site (2001).

RECLAIMED AREAS			
Total Living Cover*	x=45.44	s=16.33	n=240
Density	x=2219.51	s=2614.02	n=240
Productivity	x=1083.59	s=954.52	n=240
REFERENCE AREA			
Total Living Cover*	x=30.46	s=20.58	n=50
Density	x=917.22	s=510.58	n=50
Productivity	x=544.33	s=456.39	n=50
STATISTICAL ANALYSES			
Living Cover	t=5.626	df=288	SL=p<.005
Density	t=3.504	df=288	SL=p<.005
Productivity	t=3.899	df=288	SL=p<.005

x = sample mean, s = sample standard deviation,
n = sample size, nMIN = minimum adequate sample,
t = Student's t-value, p=probability level
df = degrees of freedom, SL = significance level,
* represents understory and overstory cover combined.

FIGURE 1: LIVING COVER
COTTONWOOD OLD WASTE: ROCK SITE (2001)

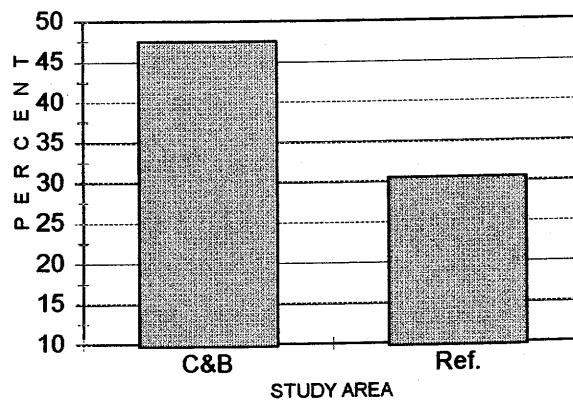


FIGURE 2: WOODY SPECIES DENSITY
COTTONWOOD OLD WASTE ROCK SITE (2001)

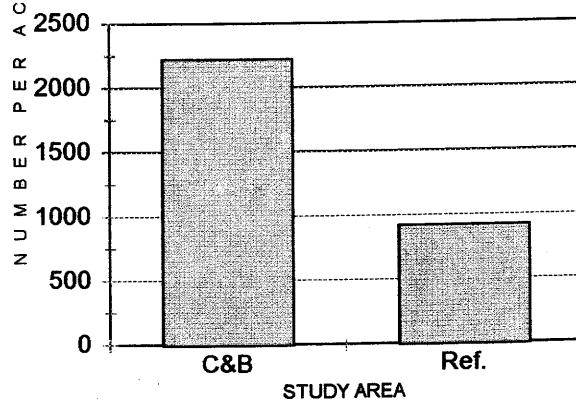
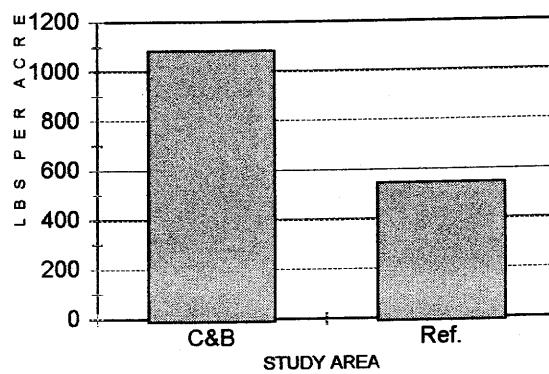


FIGURE 3: ANNUAL PRODUCTION
COTTONWOOD OLD WAST ROCK SITE (2001)



C&B = Cell & Berms
Ref. = Reference Area

**COLOR PHOTOGRAPHS
OF THE
SAMPLE AREAS**

FIGURE 4: COMPOSITION - CELLS & BERMS
COTTONWOOD OLD WASTE ROCK SITE (2001)

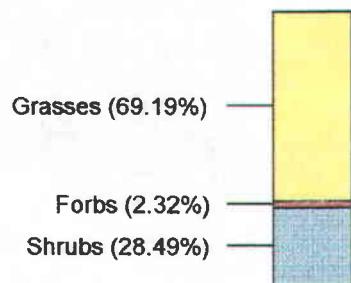


FIGURE 5: COMPOSITION - REFERENCE AREA
COTTONWOOD OLD WASTE ROCK SITE (2001)

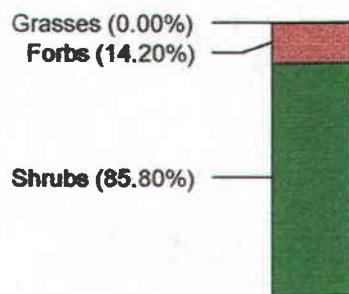
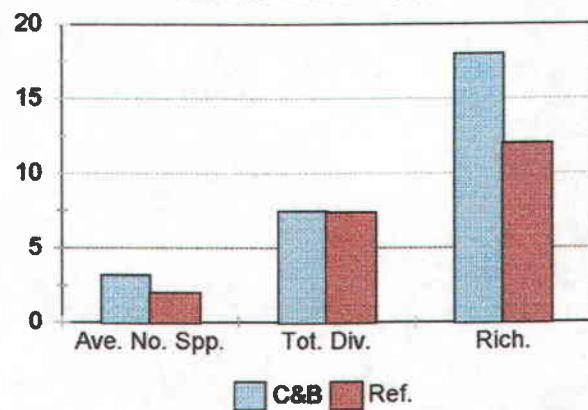


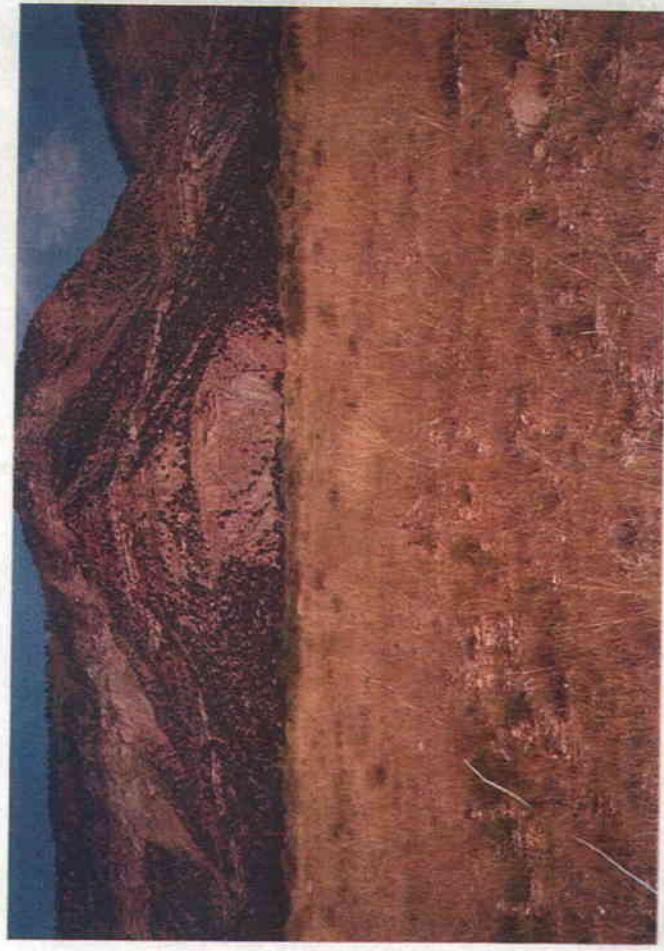
FIGURE 6: DIVERSITY
COTTONWOOD WASTE ROCK SITE (2001)



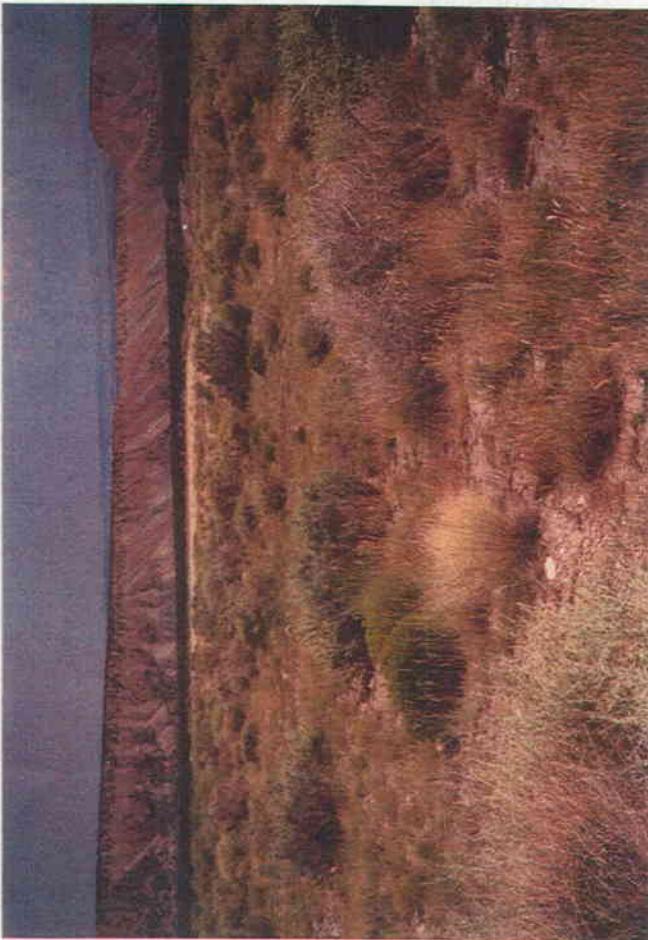
C&B = Cell & Berms
Ref. = Reference Area



Cottonwood Mine - Old Waste Rock - Cell #2



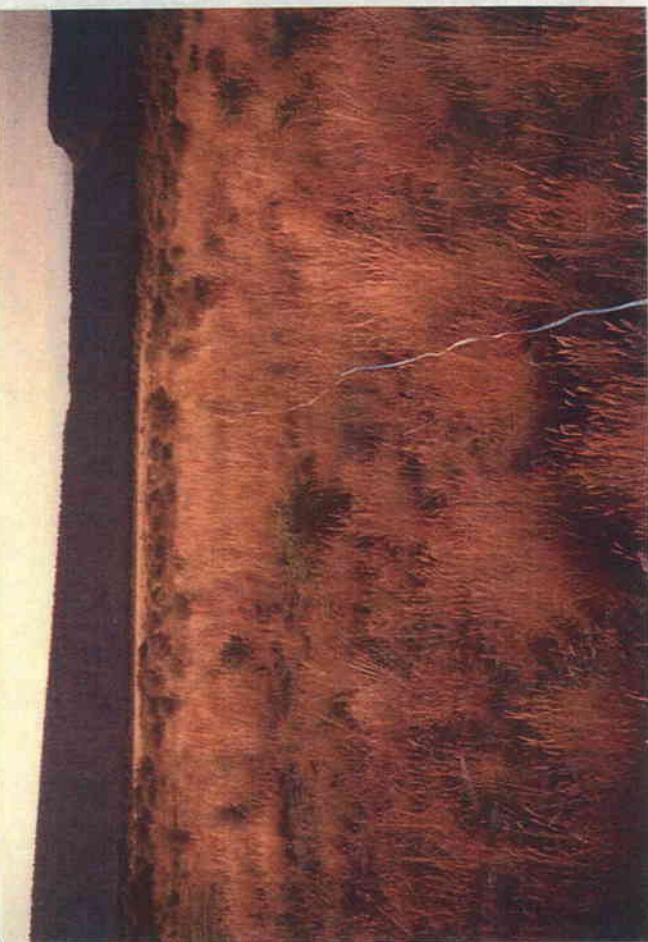
Cottonwood Mine - Old Waste Rock - Cell #4



Cottonwood Mine - Old Waste Rock - Cell #1



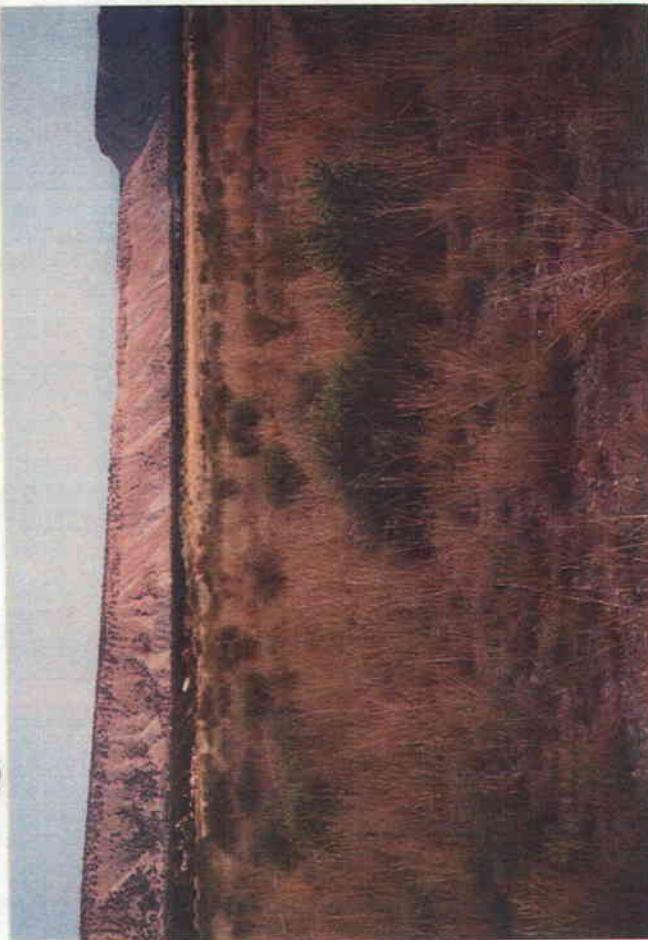
Cottonwood Mine - Old Waste Rock - Cell #3



Cottonwood Mine - Old Waste Rock - Cell 11#6



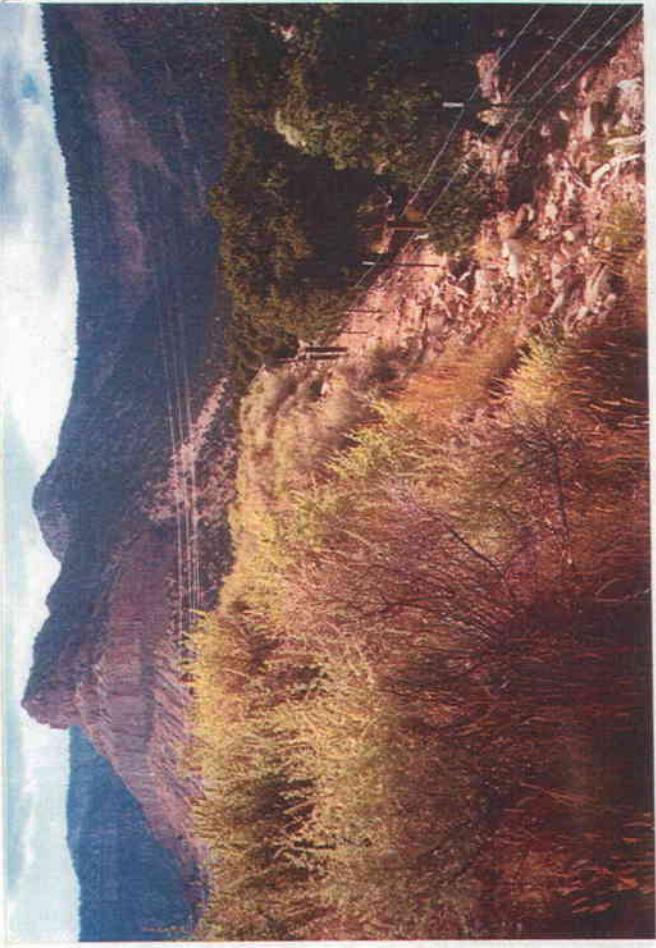
Cottonwood Mine - Old Waste Rock - Cell 11 # 7



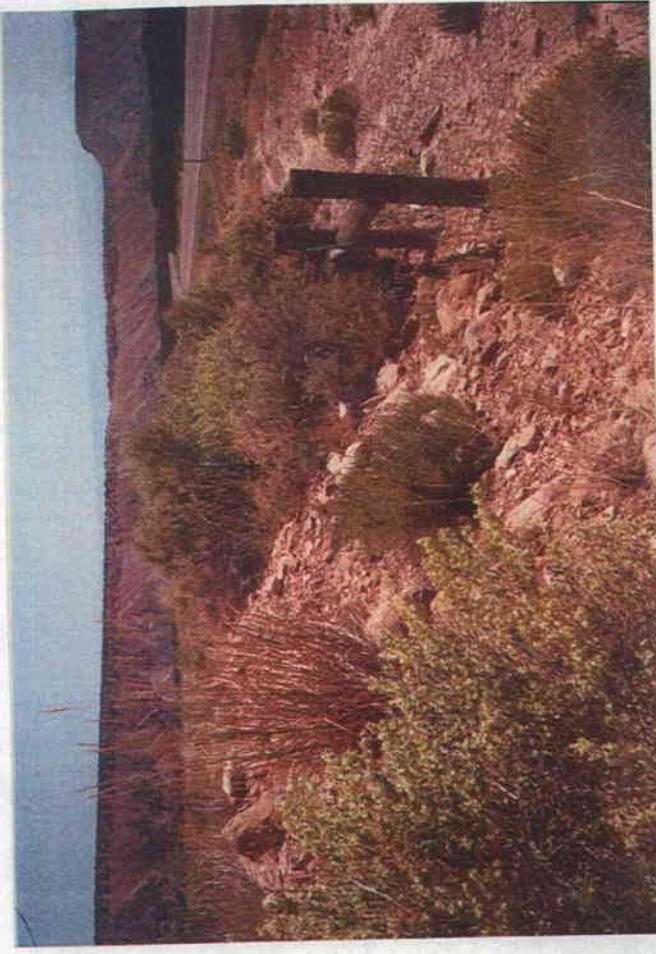
Cottonwood Mine - Old Waste Rock - Cell 11 # 5



Cottonwood Mine - Old Waste Rock - Cell 11 # 6 (Weedy Area)



Cottonwood Mine - Old Waste Rock - Berm #2



Cottonwood Mine - Old Waste Rock - Berm #3 S.W. Face



Cottonwood Mine - Old Waste Rock - Berm #1



Cottonwood Mine - Old Waste Rock - Berm #3 N.E. Face



Cottonwood Mine - Old Waste Rock - CTW Reference Area



Cottonwood Mine - Old Waste Rock - Berm #4

APPENDIX

Summarized Raw Data

ENERGY WEST MINING

Cell #1

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Atriplex canescens</i>	0.00	30.00	0.00	30.00	5.00	0.00	0.00
<i>Atriplex confertifolia</i>	0.00	0.00	0.00	0.00	0.00	0.00	13.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Gutierrezia sarothrae</i>	0.00	20.00	10.00	5.00	30.00	20.00	7.00
FORBS							
<i>Machaeranthera grindeliaoides</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00
GRASSES							
<i>Agropyron cristatum</i>	0.00	0.00	5.00	15.00	5.00	5.00	40.00
<i>Bromus tectorum</i>	0.00	5.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	15.00	0.00	0.00	15.00	5.00	5.00	10.00
<i>Elymus smithii</i>	35.00	0.00	30.00	0.00	10.00	5.00	0.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	55.00	55.00	45.00	65.00	55.00	40.00	70.00
Litter	15.00	10.00	20.00	20.00	10.00	5.00	5.00
Bareground	5.00	15.00	10.00	5.00	10.00	10.00	20.00
Rock	25.00	20.00	25.00	10.00	25.00	45.00	5.00
% COMPOSITION							
Shrubs	0.00	90.91	22.22	53.85	63.64	50.00	28.57
Forbs	0.00	0.00	0.00	0.00	0.00	12.50	0.00
Grasses	100.00	9.09	77.78	46.15	36.36	37.50	71.43

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00
20.00	0.00	0.00	10.00	0.00	0.00	30.00	65.00	15.00	45.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
20.00	15.00	20.00	0.00	25.00	40.00	20.00	0.00	10.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	8.00	0.00	5.00	0.00	0.00	15.00	25.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00
0.00	0.00	23.00	15.00	0.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60.00	40.00	50.00	35.00	25.00	40.00	70.00	90.00	55.00	60.00
10.00	15.00	10.00	5.00	5.00	5.00	10.00	3.00	10.00	5.00
10.00	10.00	10.00	10.00	15.00	10.00	5.00	5.00	15.00	10.00
20.00	35.00	30.00	50.00	55.00	45.00	15.00	2.00	20.00	25.00
66.67	62.50	40.00	42.86	100.00	100.00	78.57	72.22	45.45	83.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33.33	37.50	60.00	57.14	0.00	0.00	21.43	27.78	54.55	16.67

ENERGY WEST MINING
 Cell #1
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 0 -1 deg.
 Sample Date: 13-18 Aug 01

18.00	19.00	20.00	Mean	SDev	Freq	
TREES & SHRUBS						
0.00	0.00	0.00	0.20	0.87	5.00	<i>Artemisia tridentata</i>
0.00	0.00	25.00	13.75	18.09	50.00	<i>Atriplex canescens</i>
0.00	0.00	0.00	0.90	2.98	10.00	<i>Atriplex confertifolia</i>
0.00	0.00	0.00	0.50	2.18	5.00	<i>Chrysothamnus nauseosus</i>
0.00	0.00	0.00	0.05	0.22	5.00	<i>Ephedra viridis</i>
30.00	10.00	0.00	14.35	11.25	80.00	<i>Gutierrezia sarothrae</i>
FORBS						
0.00	0.00	0.00	0.25	1.09	5.00	<i>Macharanthera grindeloides</i>
GRASSES						
10.00	20.00	20.00	9.15	10.28	70.00	<i>Agropyron cristatum</i>
0.00	0.00	0.00	0.25	1.09	5.00	<i>Bromus tectorum</i>
10.00	5.00	0.00	3.75	5.21	40.00	<i>Elymus lanceolatus</i>
5.00	10.00	10.00	7.10	10.41	50.00	<i>Elymus smithii</i>
0.00	0.00	0.00	2.40	6.08	15.00	<i>Stipa comata</i>
0.00	0.00	5.00	0.85	2.06	15.00	<i>Stipa hymenoides</i>
COVER						
55.00	45.00	60.00	53.50	14.15		Total Living Cover
15.00	10.00	5.00	9.65	4.98		Litter
15.00	25.00	25.00	12.00	5.79		Bareground
15.00	20.00	10.00	24.85	14.37		Rock
% COMPOSITION						
54.55	22.22	41.67	55.96	26.25		Shrubs
0.00	0.00	0.00	0.63	2.72		Forbs
45.45	77.78	58.33	43.41	26.25		Grasses

ENERGY WEST MINING

Cell #2

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
<i>Atriplex canescens</i>	30.00	0.00	7.00	10.00	0.00	15.00	7.00
<i>Gutierrezia sarothrae</i>	5.00	15.00	18.00	20.00	0.00	20.00	8.00
FORBS							
GRASSES							
<i>Agropyron cristatum</i>	10.00	0.00	10.00	25.00	5.00	10.00	5.00
<i>Bromus tectorum</i>	0.00	0.00	0.00	5.00	0.00	0.00	0.00
<i>Elymus hispidus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	5.00	15.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	10.00	0.00	0.00	0.00	60.00	5.00	5.00
<i>Hilaria jamesii</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	15.00
COVER							
Total Living Cover	65.00	30.00	35.00	60.00	65.00	50.00	40.00
Litter	20.00	5.00	10.00	10.00	10.00	10.00	10.00
Bareground	5.00	25.00	30.00	15.00	10.00	10.00	40.00
Rock	10.00	40.00	25.00	15.00	15.00	30.00	10.00
% COMPOSITION							
Shrubs	53.85	50.00	71.43	50.00	0.00	70.00	37.50
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	46.15	50.00	28.57	50.00	100.00	30.00	62.50

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
10.00	0.00	0.00	5.00	0.00	0.00	10.00	10.00	0.00	0.00
5.00	15.00	20.00	15.00	5.00	5.00	5.00	0.00	10.00	10.00
15.00	0.00	5.00	5.00	0.00	0.00	0.00	10.00	20.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
10.00	25.00	0.00	5.00	30.00	5.00	0.00	10.00	10.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	15.00	5.00	0.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
40.00	40.00	35.00	30.00	35.00	30.00	45.00	30.00	40.00	40.00
10.00	10.00	5.00	5.00	10.00	5.00	15.00	5.00	10.00	5.00
25.00	15.00	35.00	5.00	15.00	45.00	20.00	10.00	25.00	35.00
25.00	35.00	25.00	60.00	40.00	20.00	20.00	55.00	25.00	20.00
37.50	37.50	57.14	66.67	14.29	16.67	33.33	33.33	25.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
62.50	62.50	42.86	33.33	85.71	83.33	66.67	66.67	75.00	75.00

ENERGY WEST MINING
 Cell #2
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 0-1 deg.

18.00	19.00	20.00	Mean	SDev	Freq	Sample Date: 13-18 Aug 01
						TREES & SHRUBS
25.00	20.00	0.00	7.45	8.84	55.00	<i>Atriplex canescens</i>
15.00	20.00	35.00	12.30	8.40	90.00	<i>Gutierrezia sarothrae</i>

FORBS

						GRASSES
5.00	10.00	0.00	6.75	6.94	65.00	<i>Agropyron cristatum</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Bromus tectorum</i>
0.00	0.00	0.00	1.25	5.45	5.00	<i>Elymus hispidus</i>
0.00	0.00	0.00	1.25	3.49	15.00	<i>Elymus lanceolatus</i>
0.00	0.00	0.00	9.00	14.20	60.00	<i>Elymus smithii</i>
0.00	0.00	0.00	0.25	1.09	5.00	<i>Hilaria jamesii</i>
0.00	0.00	0.00	0.25	1.09	5.00	<i>Hordeum jubatum</i>
5.00	0.00	5.00	2.25	4.60	25.00	<i>Stipa comata</i>
0.00	0.00	0.00	1.25	3.83	10.00	<i>Stipa hymenoides</i>

						COVER
50.00	50.00	40.00	42.50	10.78		Total Living Cover
10.00	5.00	10.00	9.00	3.74		Litter
10.00	15.00	25.00	20.75	11.43		Bareground
30.00	30.00	25.00	27.75	12.89		Rock

						% COMPOSITION
80.00	80.00	87.50	46.34	23.77		Shrubs
0.00	0.00	0.00	0.00	0.00		Forbs
20.00	20.00	12.50	53.66	23.77		Grasses

ENERGY WEST MINING

Cell #3

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Atriplex canescens</i>	5.00	15.00	15.00	25.00	0.00	0.00	20.00
<i>Gutierrezia sarothrae</i>	10.00	10.00	5.00	15.00	25.00	45.00	15.00

FORBS

GRASSES

<i>Agropyron cristatum</i>	10.00	5.00	15.00	5.00	0.00	0.00	15.00
<i>Elymus lanceolatus</i>	0.00	5.00	0.00	0.00	0.00	0.00	5.00
<i>Elymus smithii</i>	5.00	5.00	10.00	0.00	0.00	0.00	0.00
<i>Hilaria jamesii</i>	0.00	25.00	0.00	0.00	15.00	5.00	0.00
<i>Stipa comata</i>	30.00	5.00	15.00	13.00	5.00	0.00	5.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	7.00	0.00	0.00	0.00

COVER

Total Living Cover	60.00	70.00	60.00	65.00	45.00	50.00	60.00
Litter	5.00	10.00	20.00	15.00	10.00	5.00	20.00
Bareground	10.00	5.00	5.00	5.00	10.00	5.00	5.00
Rock	25.00	15.00	15.00	15.00	35.00	40.00	15.00

% COMPOSITION

Shrubs	25.00	35.71	33.33	61.54	55.56	90.00	58.33
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	75.00	64.29	66.67	38.46	44.44	10.00	41.67

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	20.00	10.00	20.00	10.00	0.00	0.00	5.00	5.00	0.00
25.00	15.00	15.00	10.00	5.00	10.00	15.00	20.00	10.00	20.00
0.00	0.00	15.00	0.00	0.00	5.00	0.00	5.00	0.00	0.00
0.00	5.00	0.00	5.00	10.00	0.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00
0.00	0.00	5.00	5.00	15.00	0.00	0.00	0.00	0.00	0.00
25.00	10.00	0.00	15.00	10.00	30.00	50.00	20.00	20.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
50.00	50.00	45.00	55.00	50.00	45.00	65.00	50.00	45.00	40.00
10.00	15.00	10.00	10.00	10.00	5.00	5.00	10.00	10.00	10.00
5.00	5.00	10.00	5.00	5.00	5.00	10.00	15.00	10.00	25.00
35.00	30.00	35.00	30.00	35.00	45.00	20.00	25.00	35.00	25.00
50.00	70.00	55.56	54.55	30.00	22.22	23.08	50.00	33.33	50.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	30.00	44.44	45.45	70.00	77.78	76.92	50.00	66.67	50.00

ENERGY WEST MINING

Cell #3

Cottonwood Mine Old Was

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

18.00	19.00	20.00	Mean	SDev	Freq	
						TREES & SHRUBS
10.00	0.00	0.00	0.50	2.18	5.00	<i>Artemisia tridentata</i>
10.00	15.00	30.00	10.25	9.15	70.00	<i>Atriplex canescens</i>
10.00	0.00	0.00	14.00	9.82	90.00	<i>Gutierrezia sarothrae</i>

FORBS

						GRASSES
0.00	0.00	15.00	4.50	5.89	45.00	<i>Agropyron cristatum</i>
0.00	0.00	0.00	1.75	2.86	30.00	<i>Elymus lanceolatus</i>
15.00	0.00	5.00	2.50	4.33	30.00	<i>Elymus smithii</i>
10.00	0.00	0.00	4.00	6.82	35.00	<i>Hilaria jamesii</i>
10.00	50.00	15.00	16.65	14.01	90.00	<i>Stipa comata</i>
0.00	0.00	0.00	0.85	2.59	10.00	<i>Stipa hymenoides</i>

						COVER
65.00	65.00	65.00	55.00	8.80		Total Living Cover
5.00	15.00	20.00	11.00	4.90		Litter
5.00	5.00	10.00	8.00	4.85		Bareground
25.00	15.00	5.00	26.00	10.20		Rock

						% COMPOSITION
46.15	23.08	46.15	45.68	17.24		Shrubs
0.00	0.00	0.00	0.00	0.00		Forbs
53.85	76.92	53.85	54.32	17.24		Grasses

ENERGY WEST MINING

Cell #4

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Cercocarpus montanus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Gutierrezia sarothrae</i>	0.00	5.00	10.00	0.00	0.00	13.00	0.00

FORBS

<i>Macharanthera grindelioides</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Sphaeralcea coccinea</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	15.00	10.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	5.00	20.00	0.00
<i>Elymus smithii</i>	40.00	0.00	0.00	20.00	25.00	0.00	55.00
<i>Hilaria jamesii</i>	0.00	0.00	0.00	0.00	10.00	7.00	0.00
<i>Stipa comata</i>	0.00	35.00	0.00	0.00	5.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	40.00	40.00	25.00	30.00	50.00	40.00	55.00
Litter	5.00	10.00	5.00	5.00	15.00	10.00	30.00
Bareground	10.00	15.00	20.00	25.00	20.00	15.00	5.00
Rock	45.00	35.00	50.00	40.00	15.00	35.00	10.00

% COMPOSITION

Shrubs	0.00	12.50	40.00	0.00	0.00	32.50	0.00
Forbs	0.00	0.00	0.00	0.00	10.00	0.00	0.00
Grasses	100.00	87.50	60.00	100.00	90.00	67.50	100.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	10.00	0.00	0.00	2.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	5.00	20.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	15.00	0.00	8.00	5.00	40.00	0.00
20.00	20.00	15.00	5.00	10.00	25.00	25.00	15.00	0.00	45.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	30.00	30.00	0.00	0.00	10.00	0.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00
35.00	50.00	50.00	40.00	25.00	45.00	35.00	50.00	50.00	50.00
5.00	10.00	25.00	10.00	10.00	25.00	10.00	10.00	10.00	10.00
35.00	30.00	5.00	10.00	55.00	10.00	30.00	15.00	10.00	20.00
25.00	10.00	20.00	40.00	10.00	20.00	25.00	25.00	30.00	20.00
14.29	0.00	0.00	25.00	0.00	11.11	5.71	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85.71	100.00	100.00	75.00	100.00	88.89	94.29	100.00	100.00	90.00

18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.00	0.00	0.00	10.00	10.00	0.00	0.00	0.00	5.00
5.00	0.00	40.00	5.00	50.00	0.00	10.00	0.00	15.00	0.00
0.00	30.00	5.00	35.00	0.00	10.00	20.00	25.00	35.00	45.00
0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00
0.00	5.00	5.00	5.00	0.00	10.00	10.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	10.00	0.00	0.00	0.00
30.00	35.00	50.00	50.00	60.00	55.00	50.00	30.00	50.00	50.00
5.00	10.00	25.00	5.00	10.00	20.00	10.00	10.00	20.00	10.00
45.00	35.00	10.00	5.00	20.00	5.00	10.00	40.00	5.00	20.00
20.00	20.00	15.00	40.00	10.00	20.00	30.00	20.00	25.00	20.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	90.00	100.00	100.00	100.00	100.00	100.00	100.00

ENERGY WEST MINING
 Cell #4
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 0 -1 deg.

28.00	29.00	30.00	Mean	SDev	Freq	Sample Date: 13-18 Aug 01
						TREES & SHRUBS
0.00	0.00	0.00	0.17	0.90	3.33	<i>Cercocarpus montanus</i>
0.00	0.00	0.00	1.83	3.52	26.67	<i>Gutierrezia sarothrae</i>
						FORBS
0.00	0.00	0.00	0.17	0.90	3.33	<i>Macharanthera grindeliaoides</i>
3.00	0.00	0.00	0.10	0.54	3.33	<i>Ephedra viridis</i>
2.00	0.00	0.00	0.07	0.36	3.33	<i>Sphaeralcea coccinea</i>
						GRASSES
0.00	50.00	5.00	5.50	10.44	40.00	<i>Agropyron cristatum</i>
5.00	0.00	0.00	7.60	13.08	46.67	<i>Elymus lanceolatus</i>
5.00	0.00	0.00	17.67	15.80	73.33	<i>Elymus smithii</i>
5.00	0.00	20.00	1.90	4.80	16.67	<i>Hilaria jamesii</i>
35.00	0.00	10.00	7.00	10.69	50.00	<i>Stipa comata</i>
0.00	0.00	20.00	2.33	6.67	13.33	<i>Stipa hymenoides</i>
						COVER
55.00	50.00	55.00	44.33	9.64		Total Living Cover
5.00	25.00	10.00	12.33	7.16		Litter
5.00	10.00	15.00	18.50	12.92		Bareground
35.00	15.00	20.00	24.83	10.76		Rock
						% COMPOSITION
0.00	0.00	0.00	5.37	10.22		Shrubs
9.09	0.00	0.00	0.64	2.38		Forbs
90.91	100.00	100.00	93.99	10.16		Grasses

ENERGY WEST MINING

Cell #5 '89 (Reseeded '93)

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Atriplex canescens</i>	5.00	5.00	0.00	15.00	15.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	15.00	0.00
<i>Gutierrezia sarothrae</i>	5.00	0.00	0.00	1.00	5.00	0.00	0.00

FORBS

<i>Kochia scoparia</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
------------------------	------	------	------	------	------	------	------

GRASSES

<i>Agropyron cristatum</i>	10.00	35.00	5.00	9.00	5.00	15.00	25.00
<i>Bromus tectorum</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus cinereus</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	5.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	10.00	0.00	0.00	5.00	0.00	0.00
<i>Stipa comata</i>	15.00	10.00	45.00	10.00	30.00	0.00	30.00

COVER

Total Living Cover	35.00	60.00	50.00	40.00	65.00	30.00	55.00
Litter	10.00	5.00	10.00	5.00	10.00	5.00	5.00
Bareground	35.00	10.00	20.00	45.00	15.00	10.00	20.00
Rock	20.00	25.00	20.00	10.00	10.00	55.00	20.00

% COMPOSITION

Shrubs	28.57	8.33	0.00	40.00	30.77	50.00	0.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	71.43	91.67	100.00	60.00	69.23	50.00	100.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	0.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	20.00	20.00	10.00	50.00	25.00	20.00	10.00	25.00	35.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	10.00	0.00	20.00	10.00	5.00	5.00	0.00
10.00	0.00	35.00	10.00	15.00	20.00	0.00	5.00	25.00	15.00
35.00	20.00	60.00	30.00	65.00	65.00	40.00	70.00	60.00	65.00
10.00	5.00	5.00	5.00	10.00	5.00	5.00	5.00	10.00	5.00
45.00	50.00	25.00	45.00	10.00	15.00	15.00	10.00	10.00	10.00
10.00	25.00	10.00	20.00	15.00	15.00	40.00	15.00	20.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	25.00	71.43	0.00	23.08
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	100.00	100.00	100.00	75.00	28.57	100.00	76.92

18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00
20.00	0.00	25.00	5.00	5.00	0.00	45.00	0.00	15.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	30.00	30.00	10.00	25.00	5.00	5.00	15.00	20.00	8.00
0.00	0.00	0.00	0.00	0.00	15.00	20.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00	5.00
10.00	5.00	10.00	15.00	5.00	0.00	0.00	20.00	10.00	20.00
55.00	35.00	65.00	35.00	40.00	20.00	70.00	40.00	50.00	35.00
10.00	5.00	25.00	5.00	5.00	5.00	5.00	5.00	5.00	10.00
20.00	20.00	5.00	40.00	20.00	25.00	20.00	20.00	20.00	10.00
15.00	40.00	5.00	20.00	35.00	50.00	5.00	35.00	25.00	45.00
36.36	0.00	38.46	14.29	12.50	0.00	64.29	0.00	30.00	5.71
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
63.64	100.00	61.54	85.71	87.50	100.00	35.71	100.00	70.00	94.29

ENERGY WEST MINING
 Cell #5 '89 (Reseeded '93)
 Cottonwood Mine Old Was
 Exposure: E
 Slope: 0 -1 deg.

28.00 29.00 30.00 Mean SDev Freq Sample Date: 13-18 Aug 01

						TREES & SHRUBS
0.00	45.00	20.00	9.57	14.41	50.00	<i>Atriplex canescens</i>
0.00	0.00	0.00	0.50	2.69	3.33	<i>Chrysothamnus nauseosus</i>
0.00	0.00	0.00	0.70	2.13	13.33	<i>Gutierrezia sarothrae</i>

						FORBS
0.00	0.00	20.00	0.67	3.59	3.33	<i>Kochia scoparia</i>

						GRASSES
5.00	0.00	5.00	17.23	11.38	96.67	<i>Agropyron cristatum</i>
0.00	0.00	5.00	1.33	4.46	10.00	<i>Bromus tectorum</i>
0.00	0.00	0.00	0.17	0.90	3.33	<i>Elymus cinereus</i>
0.00	0.00	0.00	1.17	2.11	23.33	<i>Elymus lanceolatus</i>
0.00	0.00	0.00	2.67	4.61	33.33	<i>Elymus smithii</i>
40.00	10.00	10.00	14.33	11.81	83.33	<i>Stipa comata</i>

						COVER
45.00	55.00	60.00	48.33	14.68		Total Living Cover
5.00	20.00	5.00	7.50	4.61		Litter
20.00	5.00	10.00	20.83	12.59		Bareground
30.00	20.00	25.00	23.33	12.67		Rock

						% COMPOSITION
0.00	81.82	33.33	19.80	23.43		Shrubs
0.00	0.00	33.33	1.11	5.98		Forbs
100.00	18.18	33.33	79.09	24.79		Grasses

ENERGY WEST MINING
 Cell #6 '89 (Reseeded '93)
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 0 - 1 deg.
 Sample Date: 13-18 Aug 01

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Atriplex canescens</i>	0.00	0.00	0.00	35.00	0.00	0.00	0.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	0.00	10.00
<i>Gutierrezia sarothrae</i>	10.00	0.00	0.00	0.00	0.00	0.00	5.00
FORBS							
<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Kochia scoparia</i>	0.00	0.00	10.00	0.00	20.00	0.00	0.00
GRASSES							
<i>Agropyron cristatum</i>	20.00	5.00	5.00	5.00	5.00	25.00	20.00
<i>Bromus tectorum</i>	0.00	10.00	10.00	20.00	0.00	0.00	5.00
<i>Elymus lanceolatus</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	0.00	10.00	0.00	0.00	0.00	0.00	5.00
<i>Hordeum jubatum</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.00
<i>Stipa comata</i>	5.00	15.00	0.00	5.00	0.00	25.00	15.00
<i>Stipa hymenoides</i>	5.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	45.00	40.00	30.00	65.00	25.00	50.00	60.00
Litter	10.00	5.00	5.00	5.00	5.00	10.00	5.00
Bareground	10.00	15.00	20.00	10.00	25.00	20.00	20.00
Rock	35.00	40.00	45.00	20.00	45.00	20.00	15.00
% COMPOSITION							
Shrubs	22.22	0.00	0.00	53.85	0.00	0.00	25.00
Forbs	0.00	0.00	33.33	0.00	80.00	0.00	0.00
Grasses	77.78	100.00	66.67	46.15	20.00	100.00	75.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	10.00	0.00	0.00	10.00	20.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
0.00	20.00	15.00	10.00	5.00	25.00	30.00	20.00	50.00	35.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	5.00	0.00	10.00	0.00	0.00	0.00
0.00	5.00	5.00	15.00	0.00	0.00	0.00	5.00	5.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	15.00	20.00	55.00	0.00	5.00	5.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	40.00	45.00	55.00	65.00	30.00	55.00	50.00	65.00	50.00
1.00	5.00	5.00	5.00	5.00	2.00	5.00	5.00	5.00	5.00
50.00	10.00	10.00	10.00	10.00	13.00	15.00	10.00	5.00	10.00
9.00	45.00	40.00	30.00	20.00	55.00	25.00	35.00	25.00	35.00
0.00	12.50	22.22	18.18	0.00	0.00	18.18	40.00	0.00	10.00
100.00	0.00	0.00	0.00	0.00	16.67	0.00	0.00	0.00	0.00
0.00	87.50	77.78	81.82	100.00	83.33	81.82	60.00	100.00	90.00

18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	5.00	0.00
30.00	20.00	0.00	0.00	15.00	0.00	0.00	0.00	5.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	40.00	45.00	65.00	35.00	30.00	15.00	10.00	15.00	20.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	0.00	0.00	0.00	10.00	5.00	0.00	0.00	5.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	10.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
60.00	60.00	55.00	65.00	60.00	45.00	40.00	20.00	45.00	35.00
5.00	10.00	5.00	10.00	10.00	5.00	5.00	5.00	10.00	5.00
10.00	5.00	10.00	15.00	10.00	5.00	5.00	25.00	20.00	50.00
25.00	25.00	30.00	10.00	20.00	45.00	50.00	50.00	25.00	10.00
50.00	33.33	0.00	0.00	25.00	0.00	37.50	0.00	55.56	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
50.00	66.67	100.00	100.00	75.00	100.00	62.50	100.00	44.44	100.00

ENERGY WEST MINING
 Cell #6 '89 (Reseeded '93)
 Cottonwood Mine Old Was
 Exposure: E
 Slope: 0 -1 deg.

Sample Date: 13-18 Aug 01

28.00	29.00	30.00	Mean	SDev	Freq	
						TREES & SHRUBS
0.00	20.00	0.00	1.17	4.02	10.00	<i>Artemisia tridentata</i>
0.00	0.00	35.00	6.33	10.72	36.67	<i>Atriplex canescens</i>
0.00	0.00	5.00	0.33	1.25	6.67	<i>Chrysothamnus nauseosus</i>
0.00	0.00	0.00	0.33	1.80	3.33	<i>Ephedra viridis</i>
10.00	5.00	5.00	2.00	4.00	23.33	<i>Gutierrezia sarothrae</i>
						FORBS
0.00	0.00	0.00	0.17	0.90	3.33	<i>Halogeton glomeratus</i>
0.00	0.00	0.00	2.33	7.27	13.33	<i>Kochia scoparia</i>
						GRASSES
0.00	10.00	20.00	20.83	15.23	93.33	<i>Agropyron cristatum</i>
0.00	0.00	0.00	1.50	4.31	13.33	<i>Bromus tectorum</i>
0.00	0.00	0.00	1.17	2.79	46.67	<i>Elymus lanceolatus</i>
0.00	0.00	0.00	3.17	4.56	40.00	<i>Elymus smithii</i>
0.00	0.00	0.00	0.17	0.90	3.33	<i>Hordeum jubatum</i>
25.00	0.00	5.00	7.83	11.60	53.33	<i>Stipa comata</i>
0.00	0.00	0.00	0.50	1.98	6.67	<i>Stipa hymenoides</i>
						COVER
35.00	35.00	70.00	47.83	13.08		Total Living Cover
5.00	5.00	5.00	5.77	2.29		Litter
15.00	30.00	5.00	15.60	11.17		Bareground
45.00	30.00	20.00	30.80	12.78		Rock
						% COMPOSITION
28.57	71.43	64.29	19.59	21.83		Shrubs
0.00	0.00	0.00	7.67	23.11		Forbs
71.43	28.57	35.71	72.74	26.65		Grasses

ENERGY WEST MINING
 Cell #7 '92 Partial Cell #7 '93
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 0 - 2 deg.
 Sample Date: 13-18 Aug 01

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
TREES & SHRUBS							
<i>Artemisia tridentata</i>	0.00	0.00	0.00	5.00	5.00	0.00	0.00
<i>Atriplex canescens</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00
<i>Gutierrezia sarothrae</i>	5.00	0.00	7.00	0.00	0.00	0.00	5.00
FORBS							
GRASSES							
<i>Agropyron cristatum</i>	0.00	10.00	8.00	0.00	0.00	0.00	0.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Elymus smithii</i>	15.00	0.00	0.00	30.00	5.00	0.00	30.00
<i>Stipa comata</i>	15.00	30.00	25.00	5.00	5.00	30.00	5.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COVER							
Total Living Cover	35.00	40.00	40.00	40.00	15.00	35.00	40.00
Litter	5.00	5.00	10.00	10.00	5.00	5.00	5.00
Bareground	20.00	10.00	20.00	10.00	30.00	40.00	30.00
Rock	40.00	45.00	30.00	40.00	50.00	20.00	25.00
% COMPOSITION							
Shrubs	14.29	0.00	17.50	12.50	33.33	14.29	12.50
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	85.71	100.00	82.50	87.50	66.67	85.71	87.50

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00
5.00	10.00	0.00	5.00	0.00	15.00	10.00	20.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00
5.00	15.00	0.00	0.00	0.00	10.00	5.00	10.00	0.00	45.00
20.00	10.00	15.00	25.00	15.00	0.00	5.00	10.00	5.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	35.00	20.00	40.00	15.00	25.00	45.00	40.00	45.00	45.00
5.00	5.00	2.00	15.00	5.00	5.00	5.00	5.00	10.00	5.00
10.00	40.00	23.00	20.00	25.00	25.00	25.00	35.00	25.00	15.00
50.00	20.00	55.00	25.00	55.00	45.00	25.00	20.00	20.00	35.00
14.29	0.00	0.00	0.00	0.00	0.00	55.56	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
85.71	100.00	100.00	100.00	100.00	100.00	44.44	100.00	100.00	100.00

18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	5.00	0.00	5.00	10.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	5.00	0.00	0.00	5.00	10.00	15.00	10.00	10.00	5.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	10.00	15.00	15.00	0.00	10.00	10.00	5.00	15.00	0.00
10.00	0.00	15.00	5.00	20.00	15.00	10.00	25.00	10.00	15.00
10.00	0.00	5.00	0.00	5.00	0.00	0.00	0.00	0.00	15.00
45.00	25.00	35.00	25.00	40.00	35.00	35.00	40.00	35.00	35.00
15.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	15.00
15.00	20.00	35.00	40.00	25.00	35.00	20.00	25.00	30.00	25.00
25.00	45.00	20.00	25.00	25.00	20.00	35.00	25.00	25.00	25.00
11.11	20.00	0.00	20.00	25.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88.89	80.00	100.00	80.00	75.00	100.00	100.00	100.00	100.00	100.00

28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	5.00	0.00	0.00	10.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	10.00	10.00	10.00	0.00	10.00	30.00	0.00	10.00	15.00
0.00	5.00	5.00	0.00	10.00	0.00	0.00	0.00	10.00	0.00
0.00	0.00	5.00	25.00	10.00	0.00	0.00	10.00	10.00	15.00
20.00	25.00	15.00	0.00	5.00	15.00	15.00	15.00	10.00	15.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00
30.00	40.00	35.00	40.00	25.00	30.00	45.00	40.00	50.00	45.00
10.00	15.00	10.00	10.00	5.00	10.00	5.00	10.00	5.00	15.00
45.00	25.00	25.00	25.00	45.00	45.00	35.00	10.00	10.00	20.00
15.00	20.00	30.00	25.00	25.00	15.00	15.00	40.00	35.00	20.00
0.00	0.00	0.00	12.50	0.00	16.67	0.00	0.00	20.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	100.00	87.50	100.00	83.33	100.00	100.00	80.00	100.00

ENERGY WEST MINING
 Cell #7 '92 Partial Cell #7 '93
 Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 0 - 2 deg.

Sample Date: 13-18 Aug 01

38.00	39.00	40.00	Mean	SDev	Freq	
						TREES & SHRUBS
0.00	0.00	5.00	0.38	1.32	7.50	<i>Artemisia tridentata</i>
0.00	0.00	0.00	1.38	2.74	22.50	<i>Atriplex canescens</i>
0.00	0.00	0.00	1.05	4.12	10.00	<i>Gutierrezia sarothrae</i>

FORBS

						GRASSES
15.00	10.00	10.00	7.33	6.60	67.50	<i>Agropyron cristatum</i>
0.00	0.00	10.00	2.25	6.70	20.00	<i>Elymus lanceolatus</i>
0.00	0.00	10.00	8.63	9.94	62.50	<i>Elymus smithii</i>
25.00	30.00	5.00	13.50	8.67	90.00	<i>Stipa comata</i>
10.00	10.00	10.00	2.25	4.47	22.50	<i>Stipa hymenoides</i>

					COVER
50.00	50.00	50.00	36.75	8.84	Total Living Cover
15.00	10.00	10.00	8.68	3.60	Litter
15.00	30.00	10.00	25.33	10.22	Bareground
20.00	10.00	30.00	29.25	11.54	Rock

					% COMPOSITION
0.00	0.00	10.00	7.74	11.74	Shrubs
0.00	0.00	0.00	0.00	0.00	Forbs
100.00	100.00	90.00	92.26	11.74	Grasses

ENERGY WEST MINING

Berm #1

Cottonwood Mine Old Waste Rock

Exposure: E

1 thru 5 North

Slope: 1 - 20 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Atriplex canescens</i>	5.00	0.00	45.00	0.00	0.00	5.00	15.00
<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	25.00	5.00	0.00
<i>Gutierrezia sarothrae</i>	10.00	5.00	15.00	5.00	0.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Malcomia africana</i>	35.00	25.00	0.00	5.00	0.00	5.00	0.00

GRASSES

<i>Agropyron cristatum</i>	0.00	0.00	0.00	0.00	0.00	15.00	5.00
<i>Bromus tectorum</i>	5.00	0.00	0.00	0.00	30.00	0.00	25.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	5.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Hordeum jubatum</i>	5.00	5.00	5.00	0.00	0.00	0.00	0.00
<i>Poa secunda</i>	0.00	0.00	0.00	10.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	10.00	0.00	0.00	0.00

COVER

Total Living Cover	60.00	35.00	65.00	30.00	55.00	35.00	45.00
Litter	5.00	30.00	25.00	10.00	25.00	5.00	5.00
Bareground	15.00	10.00	5.00	20.00	5.00	10.00	20.00
Rock	20.00	25.00	5.00	40.00	15.00	50.00	30.00

% COMPOSITION

Shrubs	25.00	14.29	92.31	16.67	45.45	28.57	33.33
Forbs	58.33	71.43	0.00	16.67	0.00	14.29	0.00
Grasses	16.67	14.29	7.69	66.67	54.55	57.14	66.67

ENERGY WEST MINING

Berm #1

Cottonwood Mine Old Was

Exposure: E

Slope: 1 - 20 deg.

Sample Date: 13-18 Aug 01

6 thru 10 South

8.00	9.00	10.00	Mean	SDev	Freq	
TREES & SHRUBS						
40.00	10.00	30.00	15.00	16.28	70.00	<i>Atriplex canescens</i>
0.00	0.00	0.00	3.00	7.48	20.00	<i>Chrysothamnus nauseosus</i>
0.00	0.00	0.00	3.50	5.02	40.00	<i>Gutierrezia sarothrae</i>
FORBS						
0.00	5.00	0.00	0.50	1.50	10.00	<i>Haloxylon glomeratus</i>
0.00	5.00	0.00	7.50	11.67	50.00	<i>Malcomia africana</i>
GRASSES						
10.00	25.00	30.00	8.50	10.74	50.00	<i>Agropyron cristatum</i>
5.00	5.00	0.00	7.00	10.54	50.00	<i>Bromus tectorum</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus lanceolatus</i>
5.00	0.00	0.00	0.50	1.50	10.00	<i>Elymus smithii</i>
0.00	0.00	0.00	1.50	2.29	30.00	<i>Hordeum jubatum</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Poa secunda</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Stipa hymenoides</i>
COVER						
60.00	50.00	60.00	49.50	11.93		Total Living Cover
10.00	20.00	10.00	14.50	9.07		Litter
10.00	10.00	10.00	11.50	5.02		Bareground
20.00	20.00	20.00	24.50	12.13		Rock
% COMPOSITION						
66.67	20.00	50.00	39.23	23.62		Shrubs
0.00	20.00	0.00	18.07	24.74		Forbs
33.33	60.00	50.00	42.70	21.56		Grasses

ENERGY WEST MINING**Berm #2**

Cottonwood Mine Old Waste Rock

Exposure: E & N

Slope: 1 - 20 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Atriplex canescens</i>	55.00	5.00	20.00	40.00	30.00	45.00	20.00
<i>Atriplex confertifolia</i>	0.00	0.00	5.00	10.00	0.00	0.00	5.00
<i>Gutierrezia sarothrae</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00

FORBS**GRASSES**

<i>Agropyron cristatum</i>	0.00	50.00	30.00	20.00	30.00	20.00	20.00
<i>Elymus smithii</i>	0.00	10.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	55.00	65.00	55.00	70.00	60.00	65.00	50.00
Litter	15.00	10.00	10.00	10.00	15.00	10.00	10.00
Bareground	10.00	10.00	10.00	5.00	10.00	5.00	10.00
Rock	20.00	15.00	25.00	15.00	15.00	20.00	30.00

% COMPOSITION

Shrubs	100.00	7.69	45.45	71.43	50.00	69.23	60.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	0.00	92.31	54.55	28.57	50.00	30.77	40.00

ENERGY WEST MINING

Berm #2

Cottonwood Mine Old Was

Exposure: E & N

Slope: 1 - 20 deg.

Sample Date: 13-18 Aug 01

8.00	9.00	10.00	Mean	SDev	Freq	
45.00	15.00	15.00	29.00	15.62	100.00	TREES & SHRUBS
0.00	0.00	0.00	2.00	3.32	30.00	<i>Atriplex canescens</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Atriplex confertifolia</i>
						<i>Gutierrezia sarothrae</i>

FORBS

						GRASSES
20.00	45.00	25.00	26.00	13.38	90.00	<i>Agropyron cristatum</i>
0.00	0.00	0.00	1.00	3.00	10.00	<i>Elymus smithii</i>

						COVER
65.00	60.00	40.00	58.50	8.38		Total Living Cover
10.00	10.00	10.00	11.00	2.00		Litter
5.00	10.00	20.00	9.50	4.15		Bareground
20.00	20.00	30.00	21.00	5.39		Rock

						% COMPOSITION
69.23	25.00	37.50	53.55	25.03		Shrubs
0.00	0.00	0.00	0.00	0.00		Forbs
30.77	75.00	62.50	46.45	25.03		Grasses

ENERGY WEST MINING

Berm #3

Cottonwood Mine Old Waste Rock

Exposure: NE & SW

Slope: 1 -20 deg.

Sample Date: 13-18 Aug 01

	1.00	2.00	3.00	4.00	5.00	6.00	7.00
--	------	------	------	------	------	------	------

TREES & SHRUBS

<i>Artemisia tridentata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Atriplex canescens</i>	10.00	30.00	80.00	25.00	0.00	25.00	40.00
<i>Chrysothamnus nauseosus</i>	15.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

<i>Halogeton glomeratus</i>	0.00	0.00	0.00	0.00	20.00	0.00	5.00
<i>Malcomia africana</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00

GRASSES

<i>Agropyron cristatum</i>	10.00	20.00	0.00	25.00	10.00	10.00	5.00
<i>Bromus tectorum</i>	0.00	0.00	0.00	0.00	10.00	0.00	0.00
<i>Elymus smithii</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa comata</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	35.00	50.00	80.00	50.00	45.00	35.00	50.00
Litter	10.00	10.00	10.00	20.00	10.00	10.00	35.00
Bareground	15.00	20.00	5.00	20.00	20.00	30.00	5.00
Rock	40.00	20.00	5.00	10.00	25.00	25.00	10.00

% COMPOSITION

Shrubs	71.43	60.00	100.00	50.00	0.00	71.43	80.00
Forbs	0.00	0.00	0.00	0.00	55.56	0.00	10.00
Grasses	28.57	40.00	0.00	50.00	44.44	28.57	10.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
20.00	55.00	75.00	35.00	0.00	45.00	45.00	50.00	60.00	55.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	5.00	0.00	20.00	10.00	10.00	20.00	15.00	20.00
5.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	20.00	10.00	5.00	0.00	0.00	0.00
30.00	65.00	85.00	55.00	40.00	65.00	65.00	70.00	75.00	75.00
5.00	20.00	5.00	15.00	20.00	10.00	10.00	5.00	10.00	10.00
40.00	10.00	5.00	5.00	10.00	10.00	5.00	5.00	5.00	5.00
25.00	5.00	5.00	25.00	30.00	15.00	20.00	20.00	10.00	10.00
66.67	84.62	88.24	63.64	0.00	69.23	76.92	71.43	80.00	73.33
16.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16.67	15.38	11.76	36.36	100.00	30.77	23.08	28.57	20.00	26.67

ENERGY WEST MINING

Berm #3

Cottonwood Mine Old Was

Exposure: NE & SW

Slope: 1 -20 deg.

Sample Date: 13-18 Aug 01

18.00	19.00	20.00	Mean	SDev	Freq	
						TREES & SHRUBS
0.00	0.00	25.00	1.50	5.50	10.00	<i>Artemisia tridentata</i>
0.00	0.00	5.00	32.75	24.77	80.00	<i>Atriplex canescens</i>
0.00	0.00	0.00	0.75	3.27	5.00	<i>Chrysothamnus nauseosus</i>
5.00	0.00	0.00	0.25	1.09	5.00	<i>Ephedra viridis</i>
						FORBS
0.00	0.00	0.00	1.25	4.44	10.00	<i>Halogeton glomeratus</i>
0.00	0.00	0.00	0.50	1.50	10.00	<i>Malcomia africana</i>
						GRASSES
35.00	55.00	25.00	15.25	12.89	85.00	<i>Agropyron cristatum</i>
0.00	0.00	0.00	1.00	2.55	15.00	<i>Bromus tectorum</i>
5.00	10.00	0.00	1.25	3.11	15.00	<i>Elymus smithii</i>
10.00	0.00	0.00	1.00	3.00	10.00	<i>Stipa comata</i>
0.00	0.00	0.00	1.75	4.82	15.00	<i>Stipa hymenoides</i>
						COVER
55.00	65.00	55.00	57.25	15.29		Total Living Cover
10.00	10.00	20.00	12.75	6.98		Litter
10.00	10.00	10.00	12.25	9.28		Bareground
25.00	15.00	15.00	17.75	9.15		Rock
						% COMPOSITION
9.09	0.00	54.55	58.53	30.23		Shrubs
0.00	0.00	0.00	4.11	12.50		Forbs
90.91	100.00	45.45	37.36	27.93		Grasses

ENERGY WEST MINING

Berm #4

Cottonwood Mine Old Waste Rock

Exposure: N , E

Slope: 28 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

TREES & SHRUBS

<i>Chrysothamnus nauseosus</i>	0.00	0.00	0.00	0.00	30.00	0.00	25.00
<i>Ephedra viridis</i>	5.00	0.00	10.00	0.00	0.00	0.00	0.00

FORBS

GRASSES

<i>Agropyron cristatum</i>	40.00	20.00	10.00	30.00	0.00	0.00	15.00
<i>Elymus lanceolatus</i>	0.00	0.00	0.00	0.00	0.00	35.00	0.00
<i>Elymus smithii</i>	0.00	15.00	10.00	0.00	0.00	0.00	10.00
<i>Stipa comata</i>	5.00	0.00	0.00	10.00	30.00	0.00	0.00
<i>Stipa hymenoides</i>	0.00	10.00	20.00	5.00	5.00	0.00	0.00

COVER

Total Living Cover	50.00	45.00	50.00	45.00	65.00	35.00	50.00
Litter	5.00	20.00	25.00	10.00	10.00	10.00	25.00
Bareground	5.00	5.00	5.00	10.00	10.00	10.00	10.00
Rock	40.00	30.00	20.00	35.00	15.00	45.00	15.00

% COMPOSITION

Shrubs	10.00	0.00	20.00	0.00	46.15	0.00	50.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	90.00	100.00	80.00	100.00	53.85	100.00	50.00

ENERGY WEST MINING
 Berm #4
 Cottonwood Mine Old Was
 Exposure: N , E
 Slope: 28 deg.
 Sample Date: 13-18 Aug 01

8.00	9.00	10.00	Mean	SDev	Freq	
TREES & SHRUBS						
0.00	0.00	0.00	5.50	11.06	20.00	<i>Chrysothamnus nauseosus</i>
0.00	0.00	0.00	1.50	3.20	20.00	<i>Ephedra viridis</i>

FORBS

						GRASSES
10.00	25.00	20.00	17.00	12.08	80.00	<i>Agropyron cristatum</i>
5.00	0.00	0.00	4.00	10.44	20.00	<i>Elymus lanceolatus</i>
35.00	10.00	20.00	10.00	10.72	60.00	<i>Elymus smithii</i>
0.00	0.00	0.00	4.50	9.07	30.00	<i>Stipa comata</i>
0.00	5.00	5.00	5.00	5.92	60.00	<i>Stipa hymenoides</i>

						COVER
50.00	40.00	45.00	47.50	7.50		Total Living Cover
10.00	10.00	10.00	13.50	6.73		Litter
10.00	10.00	5.00	8.00	2.45		Bareground
30.00	40.00	40.00	31.00	10.44		Rock
						% COMPOSITION
0.00	0.00	0.00	12.62	18.81		Shrubs
0.00	0.00	0.00	0.00	0.00		Forbs
100.00	100.00	100.00	87.38	18.81		Grasses

ENERGY WEST MINING

CTW Reference Area

Cottonwood Mine Old Waste Rock

Exposure: E

Slope: 1 - 5 deg.

Sample Date: 13-18 Aug 01

1.00 2.00 3.00 4.00 5.00 6.00 7.00

OVERSTORY

<i>Juniperus osteosperma</i>	35.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Pinus edulis</i>	0.00	0.00	0.00	0.00	40.00	0.00	35.00

UNDERSTORY

SHRUBS

<i>Cercocarpus montanus</i>	0.00	15.00	0.00	0.00	0.00	0.00	0.00
<i>Ephedra viridis</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>Eriogonum bicolor</i>	0.00	0.00	0.00	0.00	5.00	0.00	0.00
<i>Euphorbia fendleri</i>	0.00	0.00	5.00	0.00	0.00	0.00	0.00
<i>Juniperus osteosperma</i>	15.00	0.00	15.00	0.00	0.00	23.00	0.00
<i>Opuntia polyacantha</i>	0.00	0.00	0.00	4.00	0.00	0.00	0.00
<i>Pinus edulis</i>	0.00	0.00	25.00	0.00	5.00	0.00	10.00
<i>Rhus aromatica</i>	0.00	0.00	0.00	0.00	0.00	2.00	0.00
<i>Yucca harrmannia</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

<i>Cryptantha sp.</i>	0.00	0.00	0.00	0.00	0.00	0.00	5.00
<i>Penstemon sp.</i>	0.00	0.00	0.00	1.00	0.00	0.00	0.00

GRASSES

Elymus salinus

COVER

Overstory	35.00	0.00	0.00	0.00	40.00	0.00	35.00
Understory	15.00	15.00	45.00	5.00	10.00	25.00	15.00
Litter	65.00	15.00	10.00	25.00	85.00	45.00	80.00
Bareground	10.00	10.00	5.00	15.00	4.00	20.00	3.00
Rock	10.00	60.00	40.00	55.00	1.00	10.00	2.00

% COMPOSITION

Shrubs	100.00	100.00	100.00	80.00	100.00	100.00	66.67
Forbs	0.00	0.00	0.00	20.00	0.00	0.00	33.33
Grasses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Overstory + Understory	50.00	15.00	45.00	5.00	50.00	25.00	50.00

8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00
0.00	0.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	65.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.00	3.00	5.00	5.00	0.00	0.00	10.00	0.00	0.00	1.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	5.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	10.00	0.00	0.00	10.00	0.00	0.00	1.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
0.00	0.00	0.00	0.00	0.00	24.00	0.00	60.00	65.00	25.00
7.00	15.00	25.00	5.00	10.00	1.00	10.00	1.00	5.00	4.00
15.00	5.00	15.00	25.00	85.00	25.00	10.00	90.00	85.00	25.00
58.00	25.00	50.00	25.00	4.00	59.00	25.00	4.00	5.00	15.00
20.00	55.00	10.00	45.00	1.00	15.00	55.00	5.00	5.00	56.00
100.00	86.67	100.00	100.00	100.00	0.00	100.00	100.00	100.00	75.00
0.00	13.33	0.00	0.00	0.00	100.00	0.00	0.00	0.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.00	15.00	25.00	5.00	10.00	25.00	10.00	61.00	70.00	29.00

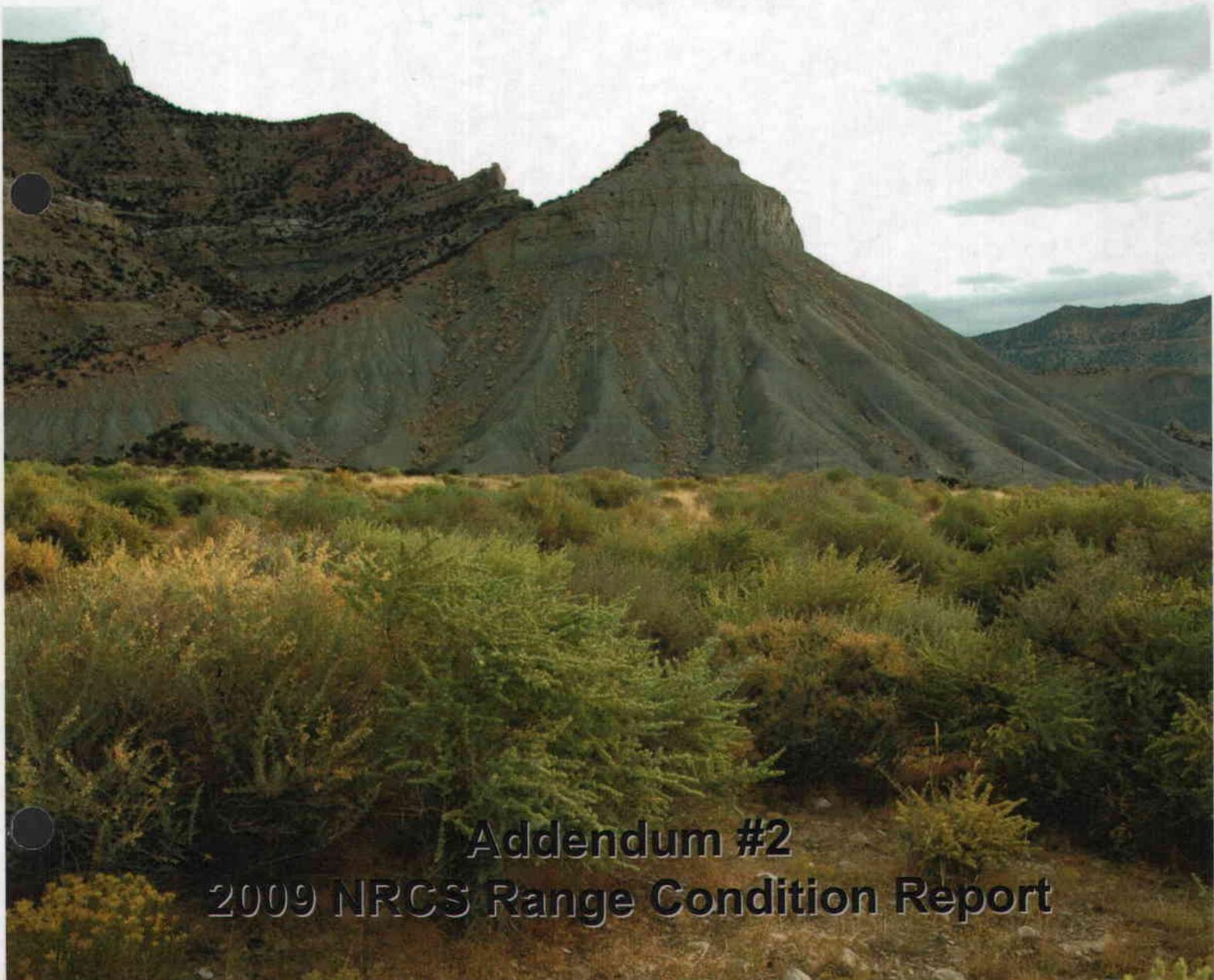
18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00
40.00	0.00	5.00	0.00	35.00	0.00	0.00	0.00	0.00	60.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00
0.00	10.00	0.00	3.00	25.00	40.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00
0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	5.00	0.00	35.00	0.00	0.00	0.00	20.00	60.00
1.00	10.00	25.00	5.00	25.00	40.00	5.00	10.00	2.00	10.00
50.00	15.00	40.00	15.00	29.00	40.00	5.00	10.00	75.00	70.00
25.00	15.00	5.00	20.00	45.00	15.00	80.00	70.00	20.00	19.00
24.00	60.00	30.00	60.00	1.00	5.00	10.00	10.00	3.00	1.00
100.00	100.00	80.00	60.00	100.00	100.00	100.00	100.00	0.00	100.00
0.00	0.00	20.00	40.00	0.00	0.00	0.00	0.00	100.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41.00	10.00	30.00	5.00	60.00	40.00	5.00	10.00	22.00	70.00

28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	0.00	25.00	0.00	25.00	0.00	0.00	19.00	60.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	1.00	0.00	25.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	3.00
25.00	17.00	0.00	25.00	24.00	25.00	5.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
30.00	0.00	25.00	0.00	25.00	0.00	0.00	19.00	60.00	0.00
25.00	20.00	2.00	25.00	25.00	25.00	30.00	1.00	10.00	15.00
55.00	25.00	15.00	10.00	70.00	35.00	10.00	5.00	50.00	20.00
10.00	25.00	43.00	20.00	4.00	25.00	30.00	80.00	39.00	25.00
10.00	30.00	40.00	45.00	1.00	15.00	30.00	14.00	1.00	40.00
100.00	95.00	100.00	100.00	100.00	100.00	100.00	0.00	100.00	100.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
55.00	20.00	27.00	25.00	50.00	25.00	30.00	20.00	70.00	15.00

ENERGY WEST MINING
 CTW Reference Area
 Cottonwood Mine Old Waste Rock
 Exposure: E
 Slope: 1 - 5 deg.
 Sample Date: 13-18 Aug 01

48.00	49.00	50.00	Mean	SDev	Freq	
						OVERSTORY
0.00	20.00	0.00	5.18	12.46	20.00	<i>Juniperus osteosperma</i>
0.00	0.00	0.00	10.78	19.49	28.00	<i>Pinus edulis</i>
						UNDERSTORY
						SHRUBS
0.00	0.00	0.00	1.22	4.42	10.00	<i>Cercocarpus montanus</i>
0.00	0.00	0.00	0.52	3.50	4.00	<i>Ephedra viridis</i>
0.00	0.00	0.00	1.10	2.22	28.00	<i>Eriogonum bicolor</i>
0.00	0.00	2.00	0.16	0.76	6.00	<i>Euphorbia fendleri</i>
0.00	25.00	0.00	2.54	6.27	20.00	<i>Juniperus osteosperma</i>
0.00	0.00	0.00	0.28	1.50	4.00	<i>Opuntia polyacantha</i>
25.00	0.00	8.00	7.72	10.60	50.00	<i>Pinus edulis</i>
0.00	0.00	0.00	0.04	0.28	2.00	<i>Rhus aromatica</i>
0.00	0.00	0.00	0.40	2.80	2.00	<i>Yucca harrmannia</i>
						FORBS
0.00	0.00	0.00	0.30	1.04	10.00	<i>Cryptantha sp.</i>
0.00	0.00	0.00	0.22	0.50	16.00	<i>Penstemon sp.</i>
						GRASSES
						<i>Elymus salinus</i>
						COVER
0.00	20.00	0.00	15.96	20.58		Oversstory
25.00	25.00	10.00	14.50	11.64		Understory
55.00	20.00	5.00	35.34	26.57		Litter
10.00	50.00	60.00	26.88	21.20		Bareground
10.00	5.00	25.00	23.28	21.45		Rock
						% COMPOSITION
100.00	100.00	100.00	85.80	30.25		Shrubs
0.00	0.00	0.00	14.20	30.25		Forbs
0.00	0.00	0.00	0.00	0.00		Grasses
25.00	45.00	10.00	30.46	20.55		Overstory + Understory

Application for Phase II and III Bond Release Cottonwood/Wilberg “Old” Waste Rock Site



**Addendum #2
2009 NRCS Range Condition Report**

United States Department of Agriculture



Natural Resources Conservation Service
540 West Price River Drive
Area Office
Price, UT 84501
(435) 637-0041
FAX (435) 637-3146

April 27, 2009

Patrick D. Collins, Ph.D.
MT. NEBO SCIENTIFIC, INC.
Research & Consulting
P.O. Box 337
330 East 400 South, Suite 6
Springville, Utah 84663

Dear Mr. Collins,

Following our phone conversation I had the opportunity to visit the Pinyon/Juniper Reference Area on April 21, 2009. The site appears to be relatively stable in terms of soil/site stability and hydrological function. However, as far as the biological integrity of the site, the herbaceous component of the site seems to be lacking. Although this site (Upland Stony Loam (Pinyon/Utah Juniper) is one in which you would not expect an abundance of herbaceous vegetation, my findings were that both the herbaceous and shrub component of the site are lacking. The Potential Natural Community (PNC) for this site indicates that the herbaceous component should make up approximately 25% cover and the shrubs 30% cover. It was apparent following a thorough walk-through of the site that the herbaceous cover/production was very low. Furthermore, although there were shrubs present, it appeared to me that the current cover was less than the 30% and the diversity within the site was low.

It is for the above mentioned reasons that I believe the overall health of the site to be in a "good" state at this time. Please keep in mind however; I believe the site to be in a vulnerable state due to the lack of herbaceous/shrub diversity, cover and production. In the event a disturbance was to occur, I believe the site could experience some dramatic changes as it relates to the soil/site stability and hydrologic function.

If you have any questions or comments please feel free to give me a call. I look forward to working with you in the future.

Sincerely,

\S\

M. DEAN STACY
USDA-NRCS
Area Range Management Specialist
Price, Utah

cc: Barry A. Hamilton, Assistant State Conservationist for Field Operations
File